THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XXII. No. 553.] LONDON, DECEMBER 2, 1873. [25TH YEAR.] Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.

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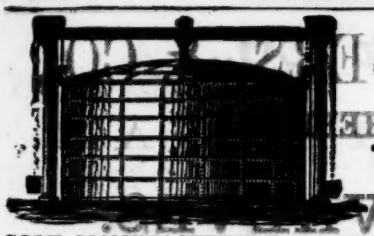

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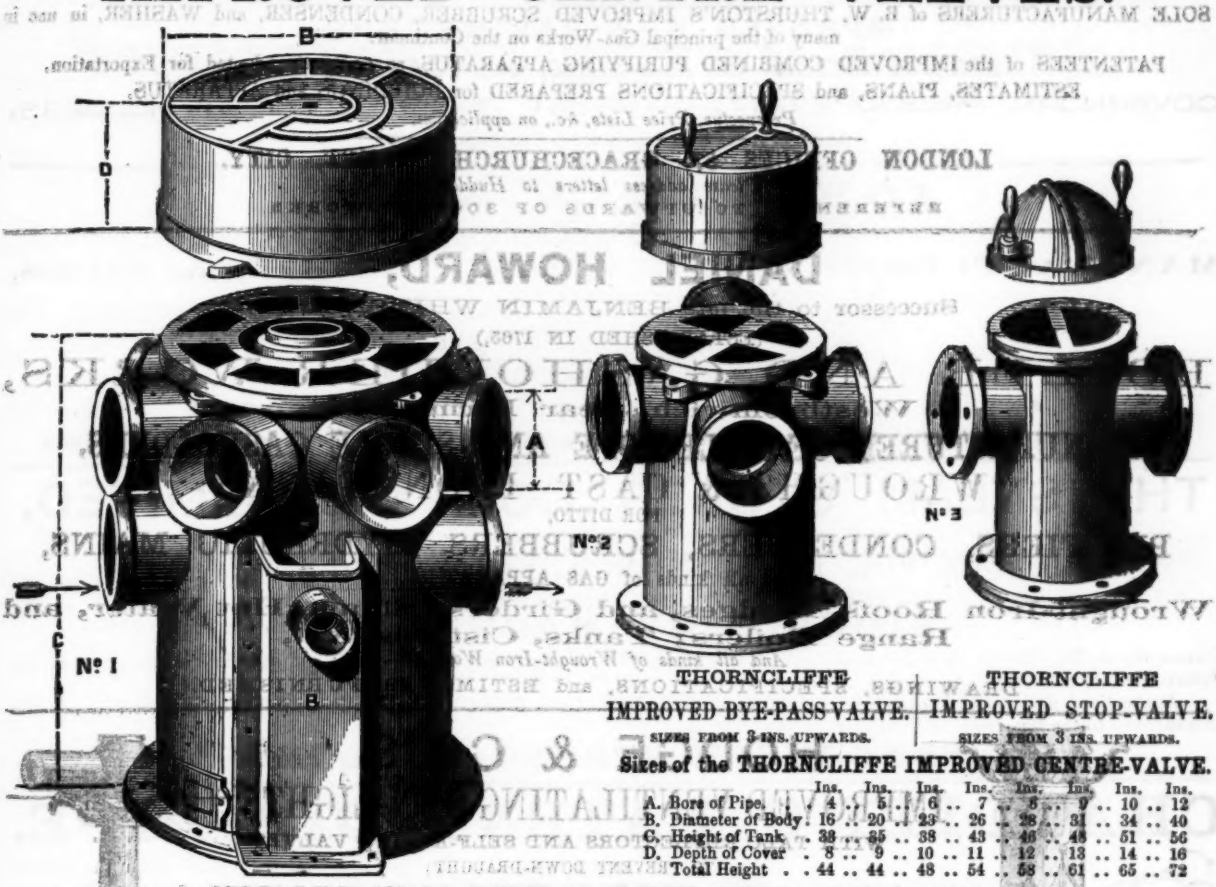

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A. Bore of Pipe.	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

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These Patent Self-Acting Dip-Pipes are rapidly coming into general use by gas companies. By their use the whole of the pressure caused by the old kind of Dip-Pipes is entirely removed, therefore the yield of gas per ton of coal is considerably increased. They also act as a perfect safeguard against the deposit of carbon (or scurf) inside the retorts.

A saving of fuel is effected, and the wear and tear to the retorts greatly diminished.

They are also perfectly Self-Acting, they being regulated solely by the gas. They cannot get out of repair, and when once fixed, will last as long as the old kind, and can be easily adjusted should the hydraulic main sink; they can also be worked with advantage where there is no exhauster.

Testimonials can be had from Herbert Unwin, Esq., engineer of the Sheffield United Gaslight Company and the Penistone Gas Company. At both these companies works they have been in constant operation for several months. Further testimonials can be had on application to the Patentee, J. G. Hawkins, Effingham Street Gas-Works, Sheffield.

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STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS,

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N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

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ARE NOW PREPARED TO GRANT

LICENCES FOR THE USE OF THEIR VARIOUS PATENTS

FOR

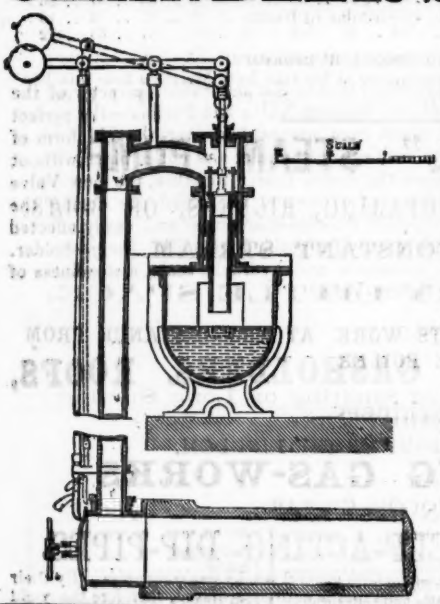
STOKING BY MACHINERY.

UNDER one or the other of their Patents, Machines can be adapted to almost any existing works without material alteration of the Retort-Houses or Settings.

Applications, accompanied by full particulars as to dimensions of the Retort-Houses, Settings of the Retorts, &c., &c., should be addressed to the Secretary, at the Offices of the Company,

155, FENCHURCH STREET, LONDON, E.C.

CHANDLER'S PATENT DIP-PIPE.



It is well known by all Gas Managers that back pressure upon the retorts greatly retards the production of gas, causing a deposit of carbon which keeps steadily accumulating. Such carbon reduces the capacity of the retorts, requires extra fuel for heating, and has to be frequently removed by heavy iron bars, which very much injure the retorts. By the use of Chandler's Patent Dip all these evils are entirely remedied. When the retorts are being drawn and charged, the Dip-Pipe is sealed in the fluid of the hydraulic main. As soon as the lids are replaced, the Dip is raised completely out of the fluid, and the gas passes unrestricted to the holders. By running the exhauster to a level gauge, ALL PRESSURE IS REMOVED FROM THE RETORTS. The consequence is that there is no deposit of carbon, no need of scurfing, no extra fuel is required, a large saving of wear and tear and loss of time is effected, and a greatly increased production of gas per ton of coal is realized.

The following testimonial letter has been received from the manager of the Erith Gas-Works:—

Messrs. Chandler and Sons.

Gentlemen,—I beg to inform you that during last week I carbonized 18 tons 5 cwt. of Ravensworth Pelaw Coal in a single setting of retorts fitted with your Patent Dip-Pipes, and obtained a yield of 195,800 feet of gas, equal to 10,730 feet per ton, which is a considerably greater yield than I have been able to obtain before using your Dip. The single retort fitted with your Patent Dip, which has now been in use here upwards of four months, has been throughout, and is now, quite free from carbon.

I am, gentlemen, &c.,

Erith Gas-Works, Aug. 2, 1873. (Signed) D. VINCENT, Manager.

For terms of use and cost, apply only to the Patentees,

Messrs. CHANDLER & SONS, ENGINEERS AND CONTRACTORS,

YORK STREET, LONDON ROAD, SOUTHWARK, LONDON, S.E.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

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AND

CONTRACTOR FOR GAS APPARATUS & MAIN-LAYING.

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SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

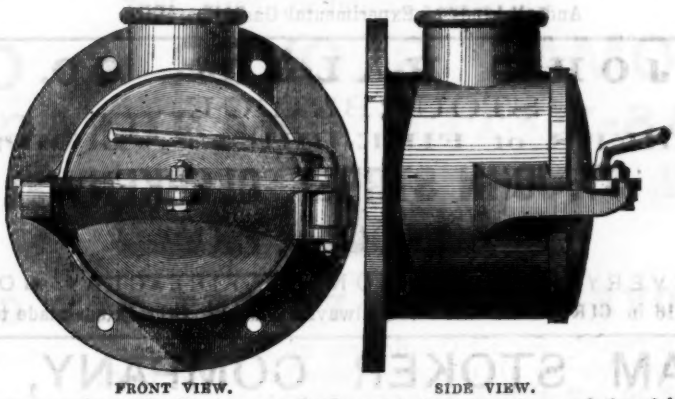
HOLMAN'S PATENT ECCENTRIC FASTENINGS.

OVER 7000 IN USE.

NO LUTING.

LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

NO SCREWS FOR FASTENING.



FRONT VIEW. SIDE VIEW.

SIMPLE.

ECONOMICAL.

DURABLE

EFFECTIVE.

NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

THESE LIDS ARE ADOPTED BY THE FOLLOWING (AMONG MANY OTHER) GAS COMPANIES:—

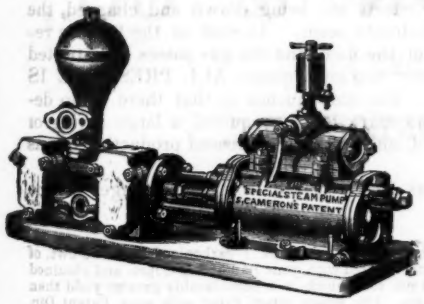
The Gaslight Company, Beckton (where over 2000 are in use).	The Gas-Works, Royal Arsenal, Woolwich.	The Nottingham Gas-Works.
„ Gaslight Company, Bow Common.	„ Alliance and Dublin Gas-Works.	„ Newcastle-on-Tyne Gas-Works.
„ London Gaslight Company.	„ Edinburgh Gas-Works.	„ Carmarthen Gas-Works.
„ Independent Gaslight Company.	„ Manchester Corporation Gas-Works.	„ Merthyr Tydfil Gas-Works.
„ Phœnix Gaslight Company.	„ Salford Corporation Gas-Works.	„ Ystrad Gas-Works.
„ South Metropolitan Gaslight Company.	„ Rochdale Corporation Gas-Works.	„ St. Alban's Gas-Works.
„ West Ham Gas Company.	„ Liverpool United Gas-Works.	„ Over Darwen Gas-Works.
„ Imperial Gaslight Company.	„ Birkenhead Gas-Works.	„ Aylesbury Gas-Works.
	„ Birmingham Gas-Works.	„ Cardiff Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

The following important Testimonial, among others, has been given:—

The Gaslight and Coke Company. Engineer's Office, 6, Westminster Chambers, Nov. 14, 1871.

Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them, and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly, (Signed) F. J. EVANS.



THE "SPECIAL" STEAM PUMP

REQUIRES NO SHAFTING, GEARING, RIGGERS, OR BELTS.

DELIVERS A CONSTANT STREAM.

OCCUPIES VERY LITTLE SPACE.

CAN BE PLACED CLOSE TO ITS WORK, AT ANY DISTANCE FROM THE BOILER,

Thus avoiding Lengths of Shafting or Long Suction and Return Pipes.

SUPPLIED TO THE FOLLOWING GAS-WORKS

FOR PUMPING EITHER WATER, AMMONIACAL LIQUOR, OR TAR.

The Gas Co., Horseferry Rd. 1	Bolton 2	Dewsbury and Batley 1	Londonderry 1	Rochdale 1
„ Equitable Gas Co. 1	Boston 1	Doncaster 1	Louth 1	Rotherham 1
„ Imperial „ 6	Bradford 1	Dunstable 1	Maidstone 1	Salford 6
„ London „ 1	Brentford 1	Eastbourne 1	Middlesborough 2	St. Alban's 1
„ Phœnix „ 6	Brighton 1	Falmouth 1	Newcastle and Gateshead .. 1	St. Helen's 2
„ South Metropolitan 1	Bristol 2	Forfar 1	Northampton 2	Shipley 1
„ Western „ 1	British Gas, Hull 1	Guernsey 1	Ogley Hay and Brownhills. 1	Southport 2
„ Alliance & Dublin Coms. 9	„ Norwich 1	Henley-on-Thames 1	Oxford 1	Stockton 1
Aldershot 1	Burnley 2	Ipswich 3	Plymouth 1	Sutton Southcote & Drypool 2
Altona 1	Burslem and Tunstall 1	Jersey 1	Portsea Island 2	Sutton 1
Arbroath 1	Bury St. Edmund's 1	Kingston-on-Hull 2	Preston 1	Tottenham and Edmonton. 1
Aylesbury 3	Cagliari 1	Kingston-on-Thames 3	Reading 2	Tunbridge 1
Banbury 1	Cork 1	Leeds 1	Richmond 6	Tynemouth 1
Barnet 1	Darlington 2	Lewes 3	Rio de Janerio 1	Wandsworth 1
Belfast 2				Windsor 1

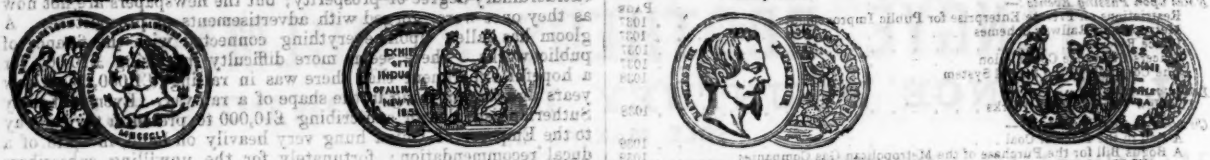
HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

TRAVELLERS AND HYDRAULIC LIFTS FOR PURIFIER-LIDS, &c.

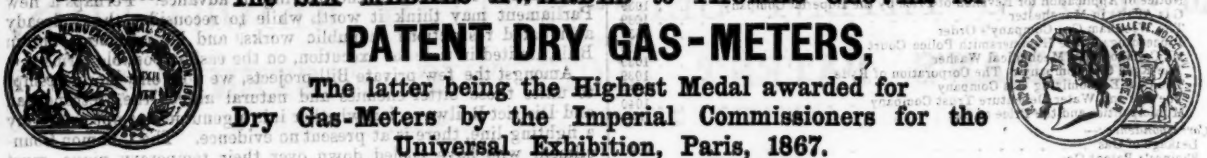
CLELAND'S PATENT DIRECT STEAM-JET EXHAUSTERS.

TANGYE'S PRIZE MEDAL STEAM-ENGINES.

London, 1851. New York, 1853. Paris, 1855. London, 1862.



Dublin, 1865. The SIX MEDALS AWARDED to THOMAS GLOVER for Paris, 1867.



PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF

PATENT WET & DRY METERS,

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EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c., &c.

WATER METERS.

W. P. & Co. beg to state that they are now prepared to supply Station-Meters with planed joints.

CONTENTS.

Notes upon Passing Events:— PAGE
Restrictions on Private Enterprise for Public Improvements . . . 1037
Metropolitan Railway Schemes . . . 1037
Police Reform . . . 1037
Officers' Grievance Commission . . . 1037
The Corporate Ward School System . . . 1038
Leading Article:—
The New Vienna Water-Works . . . 1038
Circular to Gas Companies:—
A Fall in the Price of Coal . . . 1039
A Bogus Bill for the Purchase of the Metropolitan Gas Companies . . . 1039
The Chartered Company and the Metropolitan Board and the Corporation . . . 1039
Notice of Application for Revision of Price by the Imperial Company . . . 1039
Gas Affairs in Manchester . . . 1039
The Wrexham Gas Company's Order . . . 1039
Proceedings at the Hammersmith Police Court . . . 1039
Mr. Colladon on a Mechanical Washer . . . 1039
The Ryde Gas Company *v.* The Corporation of Ryde . . . 1039
The Coal Economizing Gas Company . . . 1039
The Gas and Water Debenture Trust Company . . . 1040
Municipalities and the Price of Gas . . . 1040
Correspondence:—
Leakage of Gas . . . 1040
Skoines's Patent Gas . . . 1041
Proposed Gas Directory . . . 1042
Automatic Lamp-Lighting . . . 1042
Gas Purification in London . . . 1042
Legal Intelligence:—
Court of Queen's Bench—Ryde Gas Company *v.* The Mayor, Aldermen, and Burgesses of Ryde . . . 1042
Edinburgh Court of Session—Alliance and Dublin Gas Company *v.* Cunningham and Others . . . 1043
Hammersmith Police Court—The Gaslight and Coke Company *v.* O'Brien . . . 1044
Dublin Southern Division Police Court—Charge of Embezzlement from the Alliance Gas Company . . . 1046
Dublin Northern Division Police Court—Charge against a Gas Consumer . . . 1046
Birmingham County Court—Negligence in Repairing a Road after Repairing Pipes . . . 1046
Kingston County Bench—East Moulsey Local Board *v.* Lambeth Water-Works Company . . . 1046
Batley Police Court—Defrauding the Gas Company . . . 1046
Miscellaneous News:—
The Cearn Gas Company, Limited . . . 1046
Gas and Water Works Facilities Act, 1870, Amendment Act, 1873— Wrexham Gas . . . 1047
Board of Trade Inquiry at Cork . . . 1047
Meeting of the Imperial Continental Gas Association . . . 1050
Odessa Water-Works . . . 1052
Meeting of the Oriental Gas Company . . . 1052
Box's Anti-Dip Valve . . . 1053
Hereford Corporation Gas-Works . . . 1053
Metropolis Gas Supply . . . 1054
Metropolis Water Supply . . . 1054
"How Must I Manage the Gas?" . . . 1054
Peterborough Gas Company . . . 1054
Explosion at the Preston Gas-Works . . . 1054
Fatal Accident at the London Gas-Works . . . 1054
Gas Lighting and Sanitary Works at Constantinople . . . 1055
Suffocation by Gas at Edinburgh . . . 1055
Advances in the Price of Gas . . . 1055
Coal Consumption in Great Britain . . . 1055
Register of New Patents:—
Girdwood, R.—Illuminating by Means of Gas . . . 1055
Latham, B.—Purifying Sewage . . . 1055
Broel, J.—Lighting and Heating . . . 1055
Platt, G.—Ornamental Gas-Fittings . . . 1055
Johnson, J. H.—Treatment of Essential Oils . . . 1055
Newburn, J. C.—Cocks . . . 1055
Taylor, Buckley, and Chadwick—Drawing and Charging Retorts . . . 1055
Harrison, C. W.—Manufacture of Gas . . . 1056
Dean and Lancaster—Gas-Regulators . . . 1056
Brown, R.—Stop-Valves . . . 1056
Maquay, W.—Furnace Retorts . . . 1056
Lafarque, A.—Gas from Hydrocarbon Oils . . . 1056
Richards, W.—Charging and Drawing Retorts . . . 1056
Ramsden, J. C.—Transmitting Heat . . . 1056
Harrison, C. W.—Obtaining Oxygen . . . 1056
Atkins, F. H.—Filtration of Water . . . 1056
Attwater, H. C.—Supply and Stop Valves . . . 1056
Vincent, W.—Fuel for Heating and Illuminating . . . 1056
Emmens, S. H.—Producing Light and Heat . . . 1056
Applications for Letters Patent . . . 1056
Grants of Provisional Protection . . . 1057
Notices to Proceed . . . 1057
Patents which have passed the Great Seal . . . 1057
Patents which have become void . . . 1057

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, DECEMBER 2, 1873.

Notes upon Passing Events.

A FEW years ago, the public mind, especially the Lombard Street mind, was greatly exercised lest too much of the saving of the country should be devoted to railway and other public work investments. A sympathizing organ was found in the House of Lords in Lord Redesdale, the Wolvertons and the Overstones gave their assistance, and a series of parliamentary fetters, in the shape of regulations, were adopted, which made it a work of extreme difficulty to obtain a private Bill for any public improvement in Great Britain. But, like some costly bridges, raised in consequence of extraordinary floods, over an ordinarily peaceful brook, these fetters on enterprise have become utterly superfluous. The rush to promote public works has entirely ceased. Capital restrained at home has found its way abroad in a multitude of enterprises of various degrees of wisdom and foolishness. The country, according to all reports, is enjoying an extraordinary degree of prosperity; but the newspapers are not now as they once were, gorged with advertisements of prospectuses. A gloom has fallen upon everything connected with the finance of public works. There seems more difficulty in raising £10,000 for a hopeful experiment than there was in raising £1,000,000 a few years ago for anything in the shape of a railway. Even that truly Sutherlandish idea of subscribing £10,000 to present a toy railway to the Emperor of China hung very heavily on hand, in spite of a ducal recommendation; fortunately for the unwilling subscribers the Emperor has declined the offering in advance. Perhaps a new Parliament may think it worth while to reconsider these already antiquated restrictions on public works, and let promoters obtain Bills, limited in time for execution, on the easiest possible terms.

Amongst the few private Bill projects, we note one more attempt to unite those bitter enemies and natural allies—the Metropolitan and District Railway; but whether it is a genuine attempt or merely a fighting line, there is at present no evidence. The Common Councilmen, who have cooled down over their temporary pique, must regret that they did not permit the impecunious District Company to advance to a real Mansion House Station, and occupy the site now about to be filled by the equally obstructive premises of a security deposit company. Then the way to Moorgate Station would have been short and easy. We are told that a considerable number of the opponents of the short extension under Queen Victoria Street, were in hopes that they could compel the completion of the old junction by the Tower, and reap the profit in compensations for property purchased in advance. These hopes are now for ever dissipated. You cannot make a company without credit borrow money for works they do not want to make, which would not pay a dividend if they did.

The Aldgate and Cannon Street Railway is to commence in Harrow Alley and terminate in the Mansion House Station. It would thus unite the District line with the South-Eastern system, which is approaching its new Liverpool Street and Broad Street Station. The scheme ambitiously includes a new street commencing on the eastern side of Gracechurch Street, and terminating on the south side of Fenchurch Street; and another new street commencing on the northern side of Aldgate, and terminating on the south side of Bishopsgate Without, near Devonshire Street. It is also proposed to widen Fenchurch Street between Rood Lane and Mark Lane; all very good, but we fear, looking at existing interests, much too good to be true—that is, successful in Parliament. Another project is for uniting the Fenchurch Street Station with the Cannon Street Station—an excellent idea if the money can be found. The Postmaster-General, a stiff Presbyterian, will, as one of his first duties, be brought into collision with the ecclesiastical authorities of the City, by an application for expropriating "the rectory-house, garden, churchyard, and church of St. Mary's Woolnoth, for the purpose of enlarging the Lombard Street post-office.

Amongst the reforms looming in the future is certainly one of the police of the kingdom, which, like most of our best institutions, has grown up piecemeal, in imitation of the Metropolitan Police, established in the face of much silly opposition by Sir Robert Peel. A correspondent of a contemporary points out that while the ostensible object of a police force is to arrest criminals and keep the peace, the arrangements for the former duty are seriously impeded by the want of central organization. There is, first, the Metropolitan and the City Police—an absurdity which will disappear whenever a Cabinet, with a bumper majority, undertake metropolitan municipal reform. Besides this, every borough has its town police, and every county its rural police, each set organized, paid, and uniformed according to the fancy of the local powers; the borough or county magistrates in the large districts, often under-officered, the small ones over-officered, all competing against each other for the best-looking men. The position of chief constable of a county has come to be considered a genteel provision for a military man of good family; and as at this rank there is no promotion, the country does not get the best men in the best places. The time has gone by when political danger was to be apprehended from the existence of either a military or a police force under the command of the Government. The first step should be to organize the police as the regulars, militia, and volunteers have been organized, on a plan to be prepared by a joint committee of county and borough magistrates, by the division of the whole country into convenient districts for police purposes, irrespective o the county or the borough divisions—perhaps conterminous with the military districts. Of course such a plan would meet with vigorous opposition from vested interests; but, after the reorganization of the army, any such reform is possible.

The newspapers which took the most extravagant views of the claims of the "disestablished" officers have ceased to publish the evidence before the commission which is investigating the whole question. The evidence showed several individual cases of hardship, such as inevitably occur when any great reform is effected—hardships which it will be the duty of Parliament, by a generous vote, to redress; but it also showed, in a more unmistakeable manner, the utter rottenness of the old system under which the promotion in the army rested entirely in the hands of the wealthy, from whose superfluities the poor officers, favoured by lucky flukes, profited. The system that passed over Pollock and Nott, and sent an Elphinstone to Cabul—that left a Havelock and a Lord Clyde in the shade, while a Cardigan leaped from his banker's balance to command—and which finally took General Anson from the Turf, where, since he had seen Waterloo as a subaltern, he had passed his life, to make him Commander-in-chief in India—will not bear digging out of its grave except at a military club of what General Napier called "fine old women." But anything will do to point a paragraph before a general election.

The last defender of the Ward School system against the reformed scheme suggested by the Rev. Mr. Cummins, the Rev. Mr. Rogers, and others of the same school of practical educationists, is a Mr. Hartridge, treasurer of the Broad Street Ward Schools; and (most unconsciously) a very amusing candidate advocate he is. Mr. Hartridge treats with contempt "whimsicalities about competition and "examination for prizes for clever scholars of the poorer ranks," success in which, he considers, "will be the foundation of vexation, "pride, and discontent in after life." As a retired and successful stockbroker, he takes Mr. Dombey's view of the place of the working classes, and little Charitable Grinders are his model scholars. "Air, light, and space," he thinks can be dispensed with for schools, as it is in many offices where money is made. In Broad Street Ward there is a foundation which enables the treasurer to clothe as well as educate every boy or girl he patronizes, in the Ward Street style. Fifty boys and fifty girls are thus clothed and educated, and taken to church every Sunday. The buildings are freehold; the subscriptions pay for the education, and the trust funds pay for the clothes and other expenses. No school fees are due, so that the managers are in a position to provide handsomely for the children of their maid-servants and man-servants, clerks, porters, and humble dependents. The Rev. Mr. Cummins and his friends would "amalgamate this school with a few hundred more children, remove "it to a site where space, light, and air would not be wanting, abolish "clothing children whose parents are well able to clothe them, charge "school fees, and make a fund out of the invested property "for rewarding the diligent and capable by prizes and "by exhibitions." It is scarcely necessary to add that they would introduce a conscience clause, and not make education depend on going to church if the parents of the children preferred chapel. For these sacrilegious views, in addition to schemes for teaching a little more than the three R's—all totally subversive of the principles of the patrons of the Charitable Grinders—Mr. Hartridge suggests that the Reformers are worthy of "Newgate." It seems, however, that the Endowed Schools Act gives ample power for dealing with these charitable jobs; so, sooner or later, the uniforms so dear to Dombey and Co. will disappear from the City, and patronage will be superseded by the qualification of an infant school education and merit. The one thing wanting for amending altogether these antiquated institutions was discussion, and that we have and to spare. The idea of amalgamating several small inefficient schools into one well disciplined and well taught, is hateful to the Dombeys, because the pupils of such schools think more of the master than the patrons. On the superiority of large schools over small we have decisive evidence in the reports to the Metropolitan School Board by a special committee:

It was impossible for the Scheme Committee of the London Board to avoid the question of large *versus* small schools. The committee examined a dozen witnesses of great practical experience, including Mr. Angel, who has 1600 boys in his school in Spitalfields, there being another school for 1000 girls, and other schools for infants. These schools, attended by the poorest children of the metropolis, have the reputation of being the best schools in it. The witnesses differed on one point—the time it would take to bring a scholar up to the sixth standard. The curious fact about the difference is this—the witnesses who had to deal with the smaller numbers named the longer periods; the larger the school a witness had been connected with, the shorter period did he think it would require. Mr. Angel confidently said three years. Mr. Heller, one of the candidates for Lambeth, said five or six years. He "preferred large schools, as the gradation of classes was the more perfect." Upon this point the witnesses were unanimous, and the committee resolved and reported, "Large junior and senior schools, of 500 children and upwards, can be worked with much greater economy and efficiency than small schools." For one such school they recommend the provision of 16 teachers, a principal, four certificated assistants, and 11 pupil teachers.

THE NEW VIENNA WATER-WORKS.

THE recently inaugurated water-works for the supply of Vienna will rank among the grandest undertakings of the kind in the world. For many years the city has been supplied with water pumped from the Danube, sometimes filtered and sometimes not, but always insufficient in quantity. The supply was maintained by means of eighteen water-works, and the total quantity of water furnished is said to have been only 1,700,000 gallons per day for a city with nearly a million inhabitants. An increasing population, however, and, perhaps, advancing civilization, have pressed the question of water supply on the attention of the Municipality (who, some years ago, refused a concession to an English company), and in 1862 a commission was appointed to examine and report on the best sources of a supply for the city. They made an elaborate report in 1864, dealing first with the quantity required, and second with the quality most desirable for a town supply. As regards the quantity of water, the commissioners reported that for a population of one million, all uses for industry and luxury being taken into consideration, a daily supply of 20 million gallons was ample—*i.e.*, 20 gallons per head of population. As to the quality of the water desirable for drinking and industrial purposes, they report at some length, and summarize their opinions in the following conclusions:—

1. A perfect (faultless) drinking water must be bright, clear, free from all turbidity, odourless, and cool tasting.

2. It must contain but a small amount of solid ingredients, and no organic putrefying matter, or matter liable to putrefaction.

3. The amount of alkaline earths (lime and magnesia) should only amount to so much that their collective chemical action should correspond to not more than 18 parts of lime in 100,000 of water (*i.e.* 12·6 degrees of hardness by Clark's scale).

4. The amount of soluble salts should only be a small fraction of the total saline ingredients, and sulphates of the alkalies and magnesia and nitrates should be present in only very small quantities.

5. The temperature of the water, and the chemical composition should vary very little at different seasons of the year.

6. The access of water from impure sources, and even surface water, should be carefully excluded from that intended for domestic use.

7. The foregoing leads to the conclusion that only a soft spring water is fit for drinking purposes.

8. For industrial operations a similar water may be recommended.

9. Filtered river water may be used for business operations; but if conditions 5 and 6 are not fulfilled, it ought not to be employed.

10. For watering and cleansing the streets any water may be used which has no smell, and contains no putrefactive matter.

In the end it was reported that the springs in the neighbourhood of Vienna will afford sufficient water for the requirements of the city for a long series of years. These springs are divided into groups—those at a high level which could be carried to the city by gravitation, and those at a low level which would require pumping. The former are particularly recommended as the best source of supply; and two were eventually selected—the Kaiserbrunnen and the Stixenstein—the water from which first reached Vienna on October 24. We append analyses of the water of these springs, calculated into grains per imperial gallon.

Analysis of the Springs.

Grains per Imperial Gallon.	Kaiserbrunnen.	Stixenstein.
Chloride of sodium	0·105	0·231
Sulphate of soda	0·119	0·378
Sulphate of potash	0·077	—
Sulphate of lime	0·532	1·869
Carbonate of lime	7·217	11·739
Carbonate of magnesia	1·295	2·527
Carbonate of iron	traces	traces
Silica	0·126	0·175
Org. matter, *i.e.* loss on ignition	0·294	0·420
Total solid ingredients	9·765	17·339
Hardness, degrees	5·11	9·02
Permanent		3·03

The temperature of the water is constant at 43° Fahr. all the year round.

It will be seen from the above that the waters closely resemble the best obtained from the new red sandstone, such as the Nottingham supply.

The first named spring is about sixty miles from Vienna, and rises at a height of about 1100 feet above the level of the Danube; the second is ten miles nearer, and about 150 feet lower. The supply of water from the two is practically unlimited, but only sufficient is taken to furnish a daily supply of 20 millions of gallons in summer and 15 millions in winter. The works have been executed by Mr. Gabrielli. They were commenced in 1870, and a period of four years was allowed for their execution. Mr. Gabrielli soon found that if he relied on the workmen who could be got on the spot he could never hope to complete the works in twice that time. They have, however, been completed in three years. Having done a good deal of work in Italy and at Malta, Mr. Gabrielli decided to get Italian workmen, of whom he gradually collected some 14,000. These were assisted by a body of 350 sappers and miners, placed at the disposal of the contractor, for blasting the many long tunnels through which the canal is carried. The largest of these is quite close to the Kaiserbrunnen, in the Hirschwang, which is 10,200 feet long, and was taken in hand at twenty-two different points. The hard rock, mostly quartz, resisted gunpowder, but it had to yield to dynamite, in the use of which the sappers and miners of the Austrian army are specially skilled. In all there are nearly 18,000 feet of these tunnels.

The other difficulty to overcome was the crossing of the many transverse valleys on viaducts, of which the one at Haden contains 43 arches, varying in spans from 30 to 48 feet, and in height from 30 to 72 feet; another—that of Mödling—with arches 87 feet high; and the third that of Liesing. These viaducts could not be avoided with a difference of level of the Kaiserbrunnen of 1148 feet, and that of the Stixenstein of 968 feet, above that of the Danube canal at Vienna.

The canal which brings the water to the outskirts of the town is built over nearly the whole length either in brick or in masonry, and covered with Portland cement, rubbed with sand as smooth as marble, so as to offer the least resistance. The gradients have been skilfully distributed according to the nature of the ground, and where a moderate fall had to be distributed over a large distance, a sudden break in the level has been introduced of from 5 feet to 8 feet, in order to accelerate the flow of the waters. With these contrivances it takes about 24 hours for the water to reach Vienna.

The canal brings up the water to a small distributing reservoir of 520,000 cubic feet capacity in the Brunnhügel, and from this the water is distributed in the two main reservoirs on the Schmelz, the plateau to the west of the town, and in the Wienerberg, a plateau to the south. They are both 250 feet above the Danube level, and have together a capacity of 400,000,000 cubic feet. From these reservoirs mains are carried to the town in a length of 80,430 feet, and these distribute the water over a network of pipes all through the town in a length of about 137 English miles.

The pipe service is so estimated that throughout the city a head pressure of at least 90 feet will be maintained, so that the water will reach the tops of the houses without pumping.

At present it seems that no pipes have been laid into houses, it not having been decided who is to pay for them. The whole cost of the works is estimated at £2,000,000.

Circular to Gas Companies.

A FALL in the price of coal seems to have led many to believe that the cost of the material will shortly drop to former rates, and unthinking people to glory in the prospect. We are far from regarding the high price of coal as an unmitigated blessing. It has brought hardship to many; but at the same time it must be taken as an index of prosperity altogether unprecedented in this country. The recent fall may be ascribed to two causes. Frightened by rumours that coal would double in price before Christmas, the public filled their cellars in early autumn, and the demand for household coal is now slack. Coupled with this, the financial difficulties in America have for the time interrupted the demand for iron for that country, and less of the metal is being produced, with a corresponding diminution in the consumption of coal. Over this latter fact able editors of daily journals rejoice, and complacently regard the collapse of American trade, with its terrible consequences to the American people, and a large section of our own industrial population, as a blessing, because it brings down the price of coal. Whether the fall will be permanent or not remains to be seen. We are inclined to believe it will not continue. The diminished price of iron will immediately stimulate a large demand in this country for works which have remained in abeyance while the exaggerated prices lasted. Germany is preparing to spend a large amount of money in extending her railway communications, the iron for which will mostly be bought here, and in the spring a revival of American trade may be reasonably expected. For these reasons we can only regard the present reduction of price as temporary, and the thought of making long contracts at low prices is not to be entertained. Common gas coals are still reported firm; and the announced exhaustion of one of the most important cannel properties confirms the opinion we have repeatedly expressed, that that material will go on rising in price.

In the *London Gazette* for Nov. 28 appeared the anonymous announcement of an intended application to Parliament for an Act to enable the Metropolitan Board of Works and the Corporation of the City of London to purchase, by agreement or otherwise, the whole of the metropolitan gas companies. We do not believe that either of the public bodies named are parties to the notice, the source of which may, however, be easily guessed. It will do no one any harm; and if people are foolish enough to spend their money in this way, the companies can well afford to laugh at the folly. They are perfectly safe from municipal interference for some years to come.

In order to save both parties the serious expense of another inquiry, the Chartered Gas Company have appealed to the Corporation of London and the Metropolitan Board of Works to agree with them in fixing the price of gas for the ensuing year. Since the conditions remain much the same as at the beginning of the year, when the investigation was held, we cannot help thinking that a friendly conference between the two authorities and the company would arrange the matter without putting the company—or rather, we ought to say, the gas consumers—to the expense of another £4000. The application has been referred to the Works Committee of the Board, and we feel certain will receive from them the consideration it deserves.

The Imperial Company have now issued notice of their intention to apply for a revision of price in January next. This will involve an inquiry, for the Imperial Act of 1869 contains no clause like the 70th of the City of London Gas Act, 1868, which allows The Gas Company and the Corporation to agree as to an alteration of price or illuminating power. The omission of such a clause is to be regretted, for in this case, again, a heavy expense will be incurred, which the gas consumer must eventually pay. What the increase required by the Imperial Company will be we have, at present, no means of estimating, but it can hardly be more than 6d., and is likely, we think, to be less. After the experience of the investigation in the case of the application of the Chartered Company, we may feel certain that the interests of company and consumer will be well considered.

The Gas Committee of the Corporation of Manchester have recommended the addition of 4d. per 1000 to the price of gas within the city, and 6d. beyond; and a corresponding increase in the charges for public lamps. The agitation on the gas question, which we are happy to see in Manchester, has called out Sir Joseph Heron, who, in a long letter to the daily papers, justifies the action of the Corporation in making "a tradesman's profit" on their gas undertaking. Sir Joseph's contention is, that gas ought only to be sold at a fair market value, and that involves a net profit of 10 per cent. on the capital employed. We are thankful to him for this admission, and only regret that Lord Redesdale cannot be persuaded to take the same view. Next it is argued that the gas undertaking belongs to the *whole of the ratepayers* of Manchester. But it seems that there are 79,600 separate assessments in the city, and only 47,827 gas-meters lent. Hence there are over 30,000 ratepayers who are not consumers of gas. Now, to any ordinary mind, seeing how the gas profits are employed in Manchester, it will be perfectly clear that the (in round numbers) 50,000 consumers pay an improvement-rate for the 30,000 non-consumers; and thus, although the undertaking belongs to the *whole* of the ratepayers, it is really worked to the profit of only 30,000 of them, who are thereby saved the infliction of an improvement-rate. Sir Joseph has been very ably answered by Mr. H. F. Blair, who takes the same view of the question we do ourselves. He writes:—"No disguise of legal "terminology can veil the fact, that a profit earned on the sale of "gas in excess of what is required to make the gas-works a self-"supporting institution is substantially a tax on the consumers of "gas;" and he subsequently points out that these 30,000 non-consumers in Manchester do practically enjoy an immunity from taxation, to which they have no rational claim. The policy of the Corporation of Manchester should obviously be to keep gas as cheap as possible, and so encourage a more general consumption. When Sir Joseph Heron next appears—and he probably will in the spring—as a witness against a gas company, we hope his opinion, that 10 per cent. is a reasonable profit on a gas undertaking, will not be forgotten.

The Wrexham Gas Company have not been so successful with their application as we hoped they would be. The Board of Trade have sanctioned an increased rate of 8d. per 1000 within the borough, and a corresponding rise within the other limits mentioned in the Wrexham Gas Act. Basing his calculation on the whole year's consumption with something added, the commissioner arrived at the conclusion that this addition would give the company a dividend of £4 12s. 6d. But as the order only takes effect from the 1st inst., five months of the company's financial year will have expired. As a consequence of this, and the heavy cost of obtaining the order, it is probable that at the end of the current financial year the company will find themselves in much the same circumstances as if they had not applied for the order, and altogether unable to pay the dividend authorized. Certainly, the results of the Gas and Water-Works Facilities Act Amendment Act are not encouraging. In this case it keeps "the word of promise to the ear, but breaks "it to the hope."

"All in the Wrong" might fitly be the heading to the report we publish to-day of the proceedings at the Hammersmith Police Court, in the case of the Chartered Gas Company against Major O'Brien. Ultimately the only legal decision which could be come to was arrived at, but the way to it was certainly not cleared by the advocates on either side; while the worthy magistrate seemed to torture his brains to get something out of an Act of Parliament which was not to be found in it. The price fixed on a revision is a price for the year, asked for and granted with a specific object; the *maximum price* is the maximum fixed by the Metropolis Gas Act, 1860, beyond which the commissioners cannot go—a fact undiscovered by Mr. Besley and the magistrate, but fully understood by the advocate of the West London Gas Consumers "Vigilance Committee." We hope this important body, with whose existence we were previously unacquainted, appreciate the generosity of the company in not applying for costs. Their *raison d'être* we presume is the encouragement of litigation. They might render a much better service to their subscribers by engaging a skilled officer to teach consumers how gas may be consumed to the greatest advantage.

The French journals make known to us another anticipation of the invention of MM. Pelouze and Audouin. It is that of M. Colladon, the well-known engineer of Geneva. We have not a full description of the "mechanical washer" which M. Colladon applied to gas-works in Geneva, Rome, and Naples in 1856, 1857, and 1858; but there can be no doubt of the substantial identity of his invention with that recently patented by the two French gentlemen. The apparatus of M. Colladon was intended to act either as a condenser or a carburetter. "It is based," wrote the inventor, in 1858, "on the prin-"ciple that the best arrangement for either washing or saturating a "gas is to divide the volume into streams as fine as possible, and "cause these to strike against a solid surface kept continually moist. "By this means the currents are broken up and prevented from "moving in straight lines. Thus a gyratory movement is communicated "to the gaseous particles, which, pressed against the moist surface, take "up [when the apparatus is used to carburet a dry gas] the liquid "moistening the partitions; or [when the apparatus is employed as a "condenser] deposit on these surfaces the liquifiable matters." The apparatus is figured and described in the *Journal Polytechnique* for 1858, and also in the 62nd volume of *Brevets Expirés* (expired French patents). It is no business of ours to speculate on the effect this *réclamation* of M. Colladon may have on the validity of the patent of MM. Pelouze and Audouin; but as we have expressed a strong opinion of their invention, it is right to inform our readers that they have choice of means for effecting the same object.

The matters in dispute between the Corporation of Ryde and the gas company engaged the attention of the Court of Queen's Bench on the 14th ult., and so far the Corporation have gained a victory. It is impossible, however, that the case can end here. The idea of confining the purchase to the works within the borough limits is obviously absurd, and, so far as we know, in no case where a Corporation or Local Board has taken over a gas undertaking has the purchase been so limited; on the contrary, the supply of gas outside the municipal limits is generally considered a valuable privilege, the differential rates giving an advantage to the borough consumer. The population of Ryde outside the borough is greater than the number within the limits, and the supply of these extra inhabitants would be a source of profit to the Ryde as it is to other Corporations. A much stronger point in favour of the defendants is that the award included things the Corporation had never agreed to purchase, and to this extent the award might be easily amended. The Corporation, however, are desirous of ridding themselves of the obligation to purchase anything, and so far they have triumphed. The proceedings offer a valuable lesson to gas companies. We should never have heard of them if the umpire had made his award on the estimate of the engineers consulted by the Corporation. When before the arbitrators, the things now held to vitiate the award were never objected to; it was only the value of them that was contested, and if the Corporation could have got them at their own price, they would never have disputed the bargain. The moral of the story, so far as we can see at present, is: Never go to arbitration without a distinct obligation to purchase on the terms of the award.

The prospectus of "The Coal Economizing Gas Company

"Limited (Skoines's Patent)," is before the public, and as nothing we may now publish can affect the subscriptions for capital, we open our columns to several correspondents, who have had more or less experience with the process. We may just mention that in the description of the process given in the prospectus, chalk is omitted, and coke, brick, ironstone, furnace slag, or other analogous substance (!) substituted for it. The experience detailed by Mr. Somerville is exactly what we expected, and indeed predicated. The choking with soot or hard tarry matter is a most natural result. It was the perplexing result in the Eveleigh distillation process. Mr. Wilson, like Mr. Somerville, points out that the cost of heating must be excessive, a point on which there can be little doubt. The Patent Gas Company have threatened to dispute the validity of Mr. Skoines's patent, but the publication of the threat did not lift the shares of that company out of the slough of 3¾ discount, in which they stuck so long. It is a question which does not concern us, but we may just mention it here, and that is—Is Mr. Skoines sufficiently rewarded for his originality and ingenuity when he agrees to accept £125,000 for a patent which it is calculated will produce £120,000 a year in the metropolis alone? We think not. It may be asked too—but it is no business of ours—what a company which proposes simply to grant licences and receive royalties wants with a working capital of £30,000. We are very much afraid that we shall have to listen to the story of the Patent Gas Company over again—works always in a transition state, the process still to be perfected, and finally——?

A recent financial invention is a Debenture Trust Company, Limited. It has been applied with some success to railway shares; and with doubtful results, seeing that the shares of the Trust Company are at a discount, to shares in telegraph companies. Another company now proposes to apply the invention to shares in gas and water companies. But, as gas and water shares are among the most stable of investments, no great amount of business in these appears to be expected; and the directors of the Gas and Water Debenture Trust Company take power to engage in any business they may think fit, subject to a limitation which need not be mentioned. We should not have alluded to the matter but for the fact that the prospectus contains a clause which may mislead some. It asserts that shares in gas and water companies established for the accommodation of single towns, and consequently local in their character, though intrinsically valuable as combining profit and security, may often be obtained at a moderate price—in other words, may be picked up cheap—because they are not known in the great money markets. We recommend the enterprising projectors of this scheme to visit any country town in which there is an established gas and water company, and see if they can pick up shares at a price that will give them more than 6 per cent. for their money. To shareholders we say, Keep your shares; see that your directors do their work, and take thankfully what, perhaps, the best investment you can have, will bring you.

Municipalities evidently are in no better case with their gas undertakings than companies. The Dumbarton Corporation, who so recently came into possession, have been compelled to raise the price from 4s. 7d. to 6s., their maximum. Abroad they fare no better. The Imperial Continental Association, as our readers know, have been turned out of Cologne; and the first step taken by the Municipality of that city has been to abolish the discounts allowed by the company, and add 30 per cent. to the price of gas.

Correspondence.

LEAKAGE OF GAS.

SIR,—At the Board of Trade inquiry at Cork, last week, the gas company were met by professional engineering evidence from London—produced by the corporation, who opposed—that the unaccounted-for gas need not be more than 10 per cent., and the witness offered his services to the gas company on the principle of "no cure, no pay." Last session, and from the same witness, we had similar evidence on the Dublin Gas Bill.

Feeling unable to confirm such evidence, as applied to widely scattered districts in non-manufacturing towns, with few shops open after six p.m., I have given my reasons in a letter, which was published in Cork, a copy of which I enclose; and as the subject is one of universal interest, and wrong impressions of it are calculated to injure many gas engineers in the eyes of their proprietary, I will feel much obliged if, by publication, you will allow the matter to be ventilated in the pages of the JOURNAL OF GAS LIGHTING.

London, Nov. 20, 1873. GEORGE ANDERSON.

(COPY.)

SIR,—The extraordinary discrepancy between the evidence given by myself, on behalf of the gas company, and that given on behalf of the corporation at the late Board of Trade inquiry, coupled with the interest which the question maintains in the minds of the citizens, induces me to ask the favour of your allowing me to give some reasons why it is physically impossible that in a city like Cork, with 60 miles of main-pipes for the distribution of under 170 million feet of gas per annum, the leakage or unaccounted-for gas can ever be expected to be reduced so low as 10 per cent. of the quantity made. The reasons I am about to give were not stated before the commissioner. Had we been before a merely commercial man they would have been, but we knew that we were before a chemist of eminence, who understood the whole theory of the production and the measurement of gases, and who, without any explanation from us, could estimate the evidence given at its true value, and therefore we did not protract the inquiry. The general citizens of Cork, however, I presume, are not so technically enlightened, although they are interested in the question, and some scientific and practical reasons, showing the impossibility of such a degree of success, may clear off some prejudices that may exist in the minds of the uninitiated. When we talk of a certain per centage of "leakage," we mean the difference between the quantity of gas measured by the same station-meter in the gas-works, just before it is passed into the gasholder, and the quantity of gas registered by the small meters in the houses of the gas consumers. Now the normal temperature fixed by philosophers for the measurement of gases is 60° Fahr., and if the actual temperature is above or below this, a correction is made according to well-established rules as to the expansion or contraction of gases. Thus the gas as measured into the gasholder is corrected to 60°, but the temperature at which the gas is measured at the consuming meters varies with the temperature of the ground through which the pipes pass—sometimes as high as 50°, sometimes as low as 30°—and as more gas is sold in winter than in summer, the average temperature of the whole is less than the mean temperature of the year. Suppose we take the average temperature of the ground throughout the year at 45°, we have in this diminution of 15° a contraction of volume of about 3 per cent., without any actual loss having occurred whatever, and this contraction of volume is included in what is called "leakage"—namely, the difference between the quantity of gas registered by the meters in the gas-works and those on the premises of the consumers. In the next place, gas, when newly manufactured, contains water in the form of aqueous vapour. In the process of manufacture it is passed frequently through water, and it leaves the purifiers, and enters and is measured by the station-meter as highly charged with moisture as it can hold, what the chemist calls "saturated with moisture." This moisture is measured with the gas by the station-meter, and so long as the gas maintains a temperature of 60° it will retain the moisture, but the moment the temperature of the gas gets reduced, which it immediately does on passing through the pipes and down into the bottom of the tank sunk in the ground, that moment it begins to give up its moisture, and here is another contraction of volume, while still no actual waste or leakage has occurred, which goes to make up the loss, vulgarly called "leakage." With common air we have constant examples of this law of gases to hold and deliver moisture. We talk of dew falling, but every philosopher knows that dew does not fall but rises—it is merely the moisture rising from the warmer earth into the colder air, and there getting condensed on the first blade of grass it meets, and when the morning sun has risen sufficiently high to warm the atmosphere, it gives the air an increased capacity of holding moisture and the air licks up the dew and carries it off to form clouds that by-and-by will form rain. We notice, too, that less dew occurs on a cloudy than on a clear night, because the clouds have formed a curtain that has kept the air warm and enabled it to retain the moisture that in a clear cold night is deposited as dew. Now, so well is all this known as it applies to gas, that every engineer, in constructing a gas work, forms receivers in the line of pipe between the station-meter and the gasholder, for the purpose of containing the water that forms by the condensation of this aqueous vapour, and it is the duty of one of the men on the works to pump out this water daily. Now it is well known that 1 cubic foot of water will form 2000 cubic feet of vapour, so here is another cause of loss of volume, still without any actual "leakage" having occurred. I will not estimate the per centage of this latter cause of shrinkage of volume, but I will tell you a story of what happened to me in practice some 10 years ago, which enables me to practically put an accurate value on those apparent, and, commercially speaking, actual losses which some authorities would have us believe are all caused by the *laches* of the gas company's servants. I had contracted to manufacture gas for the War Department for the camp at Aldershot, being paid so much per 1000 feet as measured at the station-meter prior to its entering the gasholder. After a year or so the War Department sent their engineer to see how I was carrying out my contract, and he mentioned in his report that I might waste the gas of the department by overfilling the gasholder, and that it would be better for me to be paid on the gas as measured on its issuing from the gasholder instead of before it entered it. The common use of this suggestion was so obvious that I agreed to the principle at once, but I stated that I would require an increase of price, as 1000 feet of gas as measured at the inlet of the gasholder would not measure more than 950 feet at the outlet, from the causes I have here detailed, and that I would require an increase of 5 per cent. on the previous price; and this was agreed to. A large meter was erected on the works and attached to the outlet of the gasholder, and for the remainder of the contract I was paid by its registration. I had here a class of circumstances quite unique—a meter to measure the gas as it entered the gasholder—another to measure it as it left the gasholder for the consumer. I therefore determined to record the registration of both meters, and compared them, and the result of several years observation was that the difference between the two meters was between 4 and 5 per cent. Now, this large practical experiment was carried out on new works, for I contracted to build and afterwards to work the works, and the whole had been constructed under the severe inspection of the engineers of the War Department, and here we have an apparent loss of 5 per cent. before the gas left the works. But there is further apparent, without yet any real loss, for gas after it passes from the gasholder still further condenses in volume, and we form receivers on the line of pipe leading to the city, and from such receivers we pump the water of the further condensation. We have found, therefore, that about 5 per cent. of what is ordinarily reckoned up under the term "leakage" is really shrinkage, and now we come to actual leakage or gas that passes from bad joints, broken pipes, decayed pipes, and in our case all the gas burned in the works, which is considerable, for, beyond the gas that is burned throughout the entire night, we are, unlike most English companies, our own meter repairers, and every meter has to be tested by burning gas that has passed through it before it is issued to the public. Well, we have about 60 miles of main-pipes requiring 32,000 joints in uniting the pipes. We have about 5000 service-pipes with, on an average, six screwed joints to each between the main and the meter, or say 30,000 joints. Then we have some 5000 main and street-lamp taps—one to each service—every one of which begins to leak after a few years use; 90 hundreds of which, when worn out, are only worn out because they can no longer be depended on, on account of leakiness, and not because they are broken or otherwise defective. Is it likely then, that, with 32,000 main-pipe joints, 30,000 service-pipe joints, and 5000 main taps, or 67,000 possible offlets for the gas—that those joints are mostly just under the ground, and subject to all the shake of traffic, as well as oxidization, breakage of pipes from heavy traffic passing over, slakage of ground from digging sewers, and other causes that interfere with the soundness of the ground in which the pipes lie, contraction and expansion of the entire system of pipeage from alteration of temperature—is it likely, I say, that from so many disturbing causes, operating mostly unseen, and only known of when a defect shows itself by an escape, as can be delivered without a loss of some 8 to 10 per cent. of the entire quantity, but put the actual loss at only 8 per cent., and the shrinkage which we have found to be 5 per cent., we arrive at a minimum of 13 per cent., which is the lowest loss that, under the circumstances, I believe possible, but a lower loss than is ever likely to be attained. Before concluding these remarks, permit me to say that there is still another cause of loss, which never has been, and I fear never can be, prevented, but which I am not aware has ever been estimated—I refer to what is called the exosmoic action of gases, or their capacity of passing through the pores of the soundest pipes that can be made. This law is well known to chemists, and the different specific gravities of different gases do not seem to interfere with its operation. It is also known to most gas-fitters that, however sound the pipes in a house may be made, if you shut the main-tap at the meter and all the taps at the burners in one day, the air outside and the gas inside will have changed places, so that when you again open the main-tap at the meter you cannot get any light at the burners till all the air has been discharged by the force of the gas, which may take a minute or more, according to the extent of the pipeage; and this is an experiment which any gas consumer can try for himself any day on his own premises. I think that a rather unjust and a somewhat heedless attack has been made on the officials of the Cork Gas Company. I think that it is always a waste of force when men drive against the inevitable—better to clear off all arrears of judgment, and apply ourselves to the attainable; and trusting that these remarks may have this effect, while they will not cause the officials of the gas company to relax their efforts to reduce the loss to a minimum, and knowing that I write in the sight of able chemists and philosophers in Cork, I leave these remarks to produce what impression they may.

19, *Northumberland Street, Strand, London, Nov.* 15. GEORGE ANDERSON.

SKOINES'S PATENT GAS.

SIR,—Seeing the interest your readers are taking in Skoines's Patent Gas Process, will you allow me to contribute my item of experience of the process?

In June last, an offer was made to this company to try the system, and as I thought there *might* be something in it, especially in the action of the chalk combined with superheated steam upon the hydrocarbon compounds, besides the very flattering notice and report upon the process by two engineers, promising 18,000 cubic feet of 16½ candle gas from one ton of Newcastle coal, I gave my consent to the trial, and drawings were supplied for a bench of five 16-inch diameter clay retorts, nine feet long, at our Bray Station, some 14 miles from Dublin.

The arrangement was that the gas from coal, from the retorts Nos. 1, 2, and 3, entered at the mouthpiece of No. 4, which was the chalk retort, where it was joined with a rush of superheated steam, at about 1100°, then passed along, among, and through the lumps of chalk, went up a 6-inch connexion-pipe at the back into No. 5 retort charged with coke, passed over, through, and among the heated coke, then up the ascension-pipe to hydraulic, and on to condenser.

So that everything should be in perfect accordance with the drawings and instructions received, special patterns were made for castings and wrought-iron pipes, &c., the steam was introduced at the exact spot, and the chalk was got specially from London, so that it should be of the same kind. The superheater was made specially for the process, and of special iron, was built in the brick-work at the place indicated on the plans and drawings—over the furnace; and, as I expected and foretold, it burnt out the first day; then another one was placed in a chamber over the arch of the bench, and two holes were made through the arch, which caused the heat to radiate through the chamber without exposing the pipes to the draught of the furnace. The chalk was broken into lumps like coke. A Lowe's jet photometer was attached to the outlet of the meter, so that the quality of gas could be noted at once.

The three retorts were charged with Newcastle coals carefully weighed, steam was turned on through the superheater from boiler at 30 lbs. pressure, exhauster set to work, and the result was, for about an hour, gas of 18 candles, at the rate of 13,000 feet to the ton, which decreased to 9 candles and at the rate of 7000 per ton at the end of six hours.

The liquor from the condenser seemed nearly pure water, and in *great* quantity, and was evidently the superheated steam being condensed.

The process was continued for some weeks, sometimes by itself, and sometimes in conjunction with another bench of retorts. When in use by itself in the daytime, a larger quantity of cannel had to be used in the other retorts in the evening, as the gas made was so poor in illuminating power.

I have tried to get information as to how I have failed in obtaining the results stated to be realized by the process, but as yet have had no explanation, and I should be very glad if the engineers who reported upon the scheme would point out the reason of the failure.

On the second day of the trial the 6-inch connexion between the retorts Nos. 4 and 5 was stopped with a fine deposit of carbon. As the men said, "the pipe was stopped from end to end with soot," and this had to be frequently cleaned during a charge. On the third day the ascension-pipe from No. 5 retort stopped with hard tarry matter, and was also a constant source of trouble, requiring to be cleaned two or three times during a charge.

It was so troublesome that a new one was put up with a man-hole plate, 12 inches by 6 inches, cast on it for ready access for cleaning.

During the time the process was in operation the chalk retort was emptied and refilled three times, and I was given to understand the chalk would always remain as $CaO\ CO_2$, and not be converted into CaO, although I had my doubts about it. And on the fourth day, I had some chalk taken out, and, instead of coming out in lumps as it went in, it was two-thirds reduced into powder of a black colour, and some lumps on the top were white as when put in. I tested them with water, and they at once fell into a mass of slaked lime.

So my experience of the process is not at all satisfactory.

Alliance Gas-Works, Great Brunswick Street, J. SOMERVILLE.
Dublin, Nov. 20, 1873.

P.S.—Since writing the above, I see by the daily papers a company is about to be formed for carrying out the process, under the name of the "Coal Economizing Gas Company"—they must have been hard up for a name for their child—and I see they even promise more than I was led to expect, 20·600 (I will not mind the 10) cubic feet of 17·14 candle gas. I presume further experiments have led the engineers (whose names are published) to the belief that this will be the result of distilling 1 ton of Pelaw Main coal, and get 15½ cwt. of coke. They do not say how much of that coke is required to produce the quantity. Well, in the interests of gas companies, and seeing the present high price of coals, "I wish they may get it."

My experience does not agree with theirs—

1. There was no increase in quantity.
2. There was no increase in illuminating power.
3. I was never able to make sufficient of it by itself to enable me to test it for sulphur or ammonia.
4. It requires double the amount of labour that the ordinary process requires.
5. It is very expensive to alter existing settings to the new process.
6. It required nearly all the coke for the furnace and for the retort.
7. A pipe cleaner was required night and day. J. S.

Nov. 26, 1873.

SIR,—The difference in Skoines's patent process, in contradistinction from the old water gas scheme, seems to lie mainly, if not entirely, in the employment of a separate amalgamating retort.

If this be correct, the question resolves itself into three heads:—1. Does this separate retort obviate the difficulties formerly experienced? 2. If so, is it entirely original, so as to form the subject of a patent right? 3. Is it essential, or can the same results be obtained without its employment?

The principal difficulties encountered in the old process were, I think, the maintenance of heats. The large formation of carbonic oxide, and the cost of producing steam where water was not at once run into the retort.

The principles, as I understand them, are identical—viz., the deoxidation of the steam by the carbon of the gas, and the conversion of the heavy hydrocarbon vapours, which, for want of sufficient hydrogen, become condensed into the liquid we call tar; and also, I think, for the same reason, form deposits in our retorts and in our upright pipes, into carburetted hydrogen gas of a quality as a lighting agent corresponding to the amount of hydrogen absorbed.

Whatever Skoines's position in the matter may be—whether an original inventor or otherwise—I think, sir, it must be conceded that the difficulty in the maintenance of heats in the coal-carbonizing retorts is overcome in this way, and that, *assuming the steam to be heated to the point of decomposition previous to entering this separate vessel*, the probabilities are that the more perfect the mixture of the gases is, the greater will be the tendency at this point to produce CO_2 instead of CO, and if this CO_2 does not afterwards, in the coke retort, take up an additional part of carbon so as to become CO, the purification will not be difficult, and the extra expense of removing a slightly increased proportion of carbonic acid would not, I think, greatly affect the economy of the whole process.

The coke retort I take to be only an auxiliary, and if the deoxidation is complete in the lime passage, its effect will, on the whole, be rather prejudicial than otherwise.

I have never witnessed an entire experiment made by this process, but I have examined an application on the same principle said to have been considerably used, and in which very little trace of tar could be detected; and unless the statements made of the manufacture as carried on at Kilburn were utterly false, the quality as shown in the street-lamps was not such as would be produced from a mere dilution by carbonic oxide or hydrogen, without carrying with them the carboniferous particles belonging to the tarry vapours.

Possibly it may not here be out of place to inquire whether Mr. Keates and Dr. Odling, in the experiment you cite as to the conversion of tar into permanent gas, tried the effect of the addition of a quantity of pure hydrogen to the vapours volatilized, while in a highly heated condition?

I have no interest whatever in the Skoines process, and indeed I doubt very much whether his right to the amalgamating retort is sustainable. I agree with the remarks of "Chemicus," and your own, regarding what is specified as "heated chalk" and the supplementary processes, are surely hardly worth the value of insertion. Still, the system may turn out valuable, even although it may not be entirely original, owing probably the secret of its success (if success it attains) to a more favourable epoch for trying such experiments than its less fortunate predecessors enjoyed. An important retarding element will, however, be extravagance of fuel. In an ordinary setting of seven, *only four* of his retorts, carbonize coal, and this alone will run up the per centage of furnace fuel to 50 per cent. of the manufacture; besides, the formation of steam by the spare heat in the main flue will, I think, scarcely be satisfactory. I understand a separate boiler furnace is now employed, and if this is necessary, nearly all the coke produced in his four retorts will be consumed on the premises, a result, I fear, which, unless remedied, will interfere with the fulfilment of those calculations of economy upon which the adoption of the system is so confidently recommended by its promoters.

A. F. WILSON.

18, *Buckingham Street, Adelphi, W.C., Nov.* 22, 1873.

SIR,—Finding that this scheme has occasioned some degree of excitement and inquiry in the gas world, I have looked into it with the view of bringing to light, in a tangible and intelligent form, its merits, if it had any; and the result of my analysis of the statements put forth by its ten sponsors is a conviction that it is a delusion and a snare, the conclusions arrived at by the engineers and gas managers concerned having been drawn from incomplete and imperfect data.

It is a compound method of effecting, by a single process or operation, that which has been much better done by separate systems under patents obtained previously by other men; notably by Dr. Eveleigh and Mr. Ruck for example, to say nothing of other experimenters preceding them, who in one form or another have sought to convert the bye-products of coal distillation into gas, and to make superheated steam useful in the manufacture.

I believe it will entirely break down when practically applied in settings of seven retorts, as shown in the diagram published in your last issue, the mechanical details being ill adapted to the end in view, all the mouthpieces of the retorts being securely bolted together, with short, inflexible, and unyielding connexions; and the retorts, when subjected to the high degree of heat requisite for dealing with steam so as to decompose it, the result must be much more than commonly destructive and proportionately expensive as regards the important item of wear and tear.

But if this mechanical difficulty be overcome, and sets of seven retorts rendered workable, another objection crops up, and that is the injury done to the gas by passing it from one hot retort to another, through all the seven indeed; keeping it in contact with highly-heated surfaces as *long* instead of as *short* a time as possible, the inevitable effect being the increase of deposited carbon and a diminished amount of illuminating power. One would have thought that this was known to every tyro among gas-makers. Who, indeed, does *not* know that the best of the light-giving matters are deposited inside retorts in an increased proportion by such means? (*Vide* Mr. Lowe's experiments and Mr. Bowditch's process.)

Again, if this latter evil is avoided by falling back on the use of *three* retorts, as dealt with in the report of Messrs. Romans and Stevenson, and now being tried at Tenby, the remedy will be about as bad as the disease, because it comes to this—that where two retorts are required to produce a given quantity of gas on the old system, *three* are required on the new. Thus a work now using, say, 1000 retorts, would on the new plan require 1500; 50 per cent., therefore, would have to be added to the present retort power, and a corresponding addition to retort-house accommodation, which means 50 per cent. more capital employed in this department, and revenue would be taxed with the extra cost of wear and tear, fuel and labour involved in the working; and all for what? Why, to realize *a loss*; for the "mountain in labour" will not bring forward even the familiar mouse, and this I will now endeavour to make plain.

The cardinal virtue of the scheme is the "enormous advantage" of saving "one-half the coals now used." Well, let us see what this is worth, without any reference to the questions as to extra retorts, retort-houses, additional labour, and wear and tear.

Messrs. Romans and Stevenson put the quantity of gas obtainable from a ton of first-class Newcastle coals at 18,000 cubic feet, but it must be borne in mind that this deduction is based on experiments upon "7 lbs. of coal used in each charge," as explained by Mr. Frazer in a foot-note; and bearing in mind also that Mr. Reid, in his certificate, puts the increased quantity at 50 per cent. more gas per ton of coal," I think it fair to conclude that when tried on a practical, every-day working scale, it will be found that the increase will *not* exceed 50 per cent., and if so, the financial result will be something like this.

Given,—two tons of coal are required to produce 20,000 cubic feet of gas in the ordinary way, and on the proposed new plan one ton and one-third, and as in the first case two-thirds at least of the coke produced is sold, besides all the tar and ammoniacal liquor, whereas, in the second case, the only residual product is coke, and of that not more than one-third will be left for sale, if so much, the account will stand approximately thus:—

Two tons of coals, costing, at 25s.	£2	10	0
Less value of residual products, at 15s.	1	10	0
Leaving net cost of coals	£1	0	0
One ton and one-third of coals, costing, at 25s.	£1	13	4
Less value of one-third the coke produced	0	9	4
Leaving net cost of coals	£1	4	0

The loss resulting from the proposed "*economy*" being 4s. in the coal account for 20,000 cubic feet of gas, which is in round numbers 2½d. for 1000 feet, instead of a saving of "one shilling," it follows that if the plan were adopted by "the ten great metropolitan companies," their profits, instead of being "augmented," as stated in the prospectus "£500,000 per annum," would be diminished by £100,000, or thereabouts; and if for this easily estimated privilege they paid to the Coal Economizing Gas Company a royalty of 3d. per 1000 feet, their total loss due to the adoption of the process would be £220,000.

"Dear me, said the young lady of Tenby,
Oh, where can the eyes of the men be?"—*Nursery Rhyme.*

R. P. SPICE.

21, *Parliament Street, Westminster, S.W., Nov.* 27, 1873.

PROPOSED GAS DIRECTORY.

SIR,—With reference to the proposal of the West of Scotland Association of Gas Managers, noticed in your issue of yesterday, allow me to say that in 1869 I forwarded to our late esteemed friend, the then editor of the JOURNAL, a note of which the enclosed is a copy. As no action was taken in the matter at that time, I now beg to forward same to you, and have to repeat that I shall be very happy to become a subscriber to a directory of the kind referred to.

Gas-Works, Lewes, Nov. 19, 1873. W. WRIGHT.

(COPY.)

"Permit me to suggest an additional column in your six-monthly share list of metropolitan and provincial gas companies, for price received for public lights and number of hours burning, or, if this is too much, could you not publish an annual statement of all particulars relative to public lighting in the towns, &c., in the kingdom. I shall be very happy to become a subscriber."

AUTOMATIC LAMP-LIGHTING.

SIR,—In your last issue I observe a full description of Mr. Wilson's automaton lamplighter, which no doubt is a very ingenious contrivance, and must be admitted by all interested in public lighting to be a step in the right direction. But allow me to say, Mr. Editor, that the apparatus described is precisely upon the same principle as that patented by me about four years ago, and which has been in operation here ever since with the greatest satisfaction. The only difference between Mr. Wilson's and mine is that he employs a holder which works in mercury, and I use a diaphragm, which I find to be more simple and effectual, although both plans are included in my specification. Mr. Wilson does not say what the cost of his is. I fear in its complicated form it will be rather expensive. Mine are to be had at 7s. 6d. each. EDWARD PRICE, Engineer and Manager.

Hampton Court Gas Company, Nov. 27, 1873.

GAS PURIFICATION IN LONDON.

SIR,—As Mr. Patterson appears to have misunderstood the meaning of my last, I will endeavour to state the objections to his process of purifying gas by caustic soda more clearly.

Supposing a certain quantity of gas takes 100 tons of lime to purify it on the old dry lime process, then on Mr. Patterson's process it will take 90 tons of lime to decarbonate the soda he has used, instead of the above 100 tons of lime, and there will be a loss of 5 tons of soda in the process. Now, taking lime at £1 per ton, and soda at £15 per ton, the cost will be, irrespective of labour, which will be about the same in both cases—

Old dry lime process—100 tons lime at £1	.	£100
Patterson's soda process—90 tons lime at £1	.	£90
5 tons soda at £15	.	75
		£165

The process of decarbonating the soda liquor charged with impurities from the gas will be a very offensive one—worse, even, than the old dry lime process.

Laboratory, 86, Willes Road, Kentish Town, London, Nov. 29, 1873. EDMUND R. SOUTHBY.

Legal Intelligence.

COURT OF QUEEN'S BENCH.—FRIDAY, Nov. 14.

(*Sittings in Banco, before Justices* BLACKBURN, QUAIN, *and* ARCHIBALD.)

RYDE GAS COMPANY *v.* THE MAYOR, ALDERMEN, AND BURGESSES OF RYDE.

Sir JOHN KARSLAKE, Q.C., Mr. MICHAEL, and Mr. C. BOWEN, appeared for the plaintiffs; Mr. MANISTY, Q.C., Mr. GIFFORD, and Mr. TAYLEUR for the defendants.

This case arose out of the arbitration for the purchase of the plaintiffs works, the proceedings on which arbitration were reported at great length in the JOURNAL last year. Subsequent to the giving of the award, the corporation declined to complete the purchase, and the gas company brought an action for the recovery of the sum of £58,443 awarded them by the umpire. The question came before the court this day for argument on cross demurrers, the substantial point to be decided being whether the award was bad by reason of its including property belonging to the plaintiffs, which the corporation, under their Act, were not empowered to purchase.

Sir JOHN KARSLAKE read the declaration, which set out portions of the Ryde Improvement Act, 1854. By the 85th section of that Act, the Improvement Commissioners were empowered to purchase by agreement from the Ryde Gas Company, all the land, buildings, gas-works, gasometers, retorts, mains, and pipes of the said company, and also to contract for and purchase any other gas-works, gas apparatus, mains, pipes, and machinery within the town; and to purchase or rent, on terms to be agreed on, and not in the exercise of any compulsory power, any land, not exceeding five acres, which might be necessary for the extension or improvement of the gas-works; and also to sell or dispose of the refuse of any gas; and it was also thereby enacted that upon any contract being made or entered into by the commissioners for the purchase of any gas-works, gas apparatus, mains, pipes, and machinery, it should be lawful for the owner or owners thereof to sell and convey the same, and all right and interest therein, to the commissioners, for such price or consideration as should be agreed upon for the purchase of the same: Provided always, that before constructing any buildings, gasometers, apparatus, or machinery for the purpose of manufacturing gas, or renting or purchasing lands for the establishment of gas-works, as aforesaid, the commissioners shall give notice, in writing, to the Ryde Gas Company, stating the willingness of the commissioners to purchase the existing gas-works, apparatus, pipes, machinery, and other things belonging thereto; and it shall not be lawful for the commissioners to construct any gas-works, machinery, or apparatus for the manufacture of, or to manufacture and supply gas, unless and until the said company shall, for the space of six months next after the giving of such notice, neglect or refuse to sell and convey the same gas-works, apparatus, pipes, machinery, and other things, upon such terms, and at such price, as shall be agreed between the commissioners and such company; or as, in case of difference, shall be ascertained and settled in the manner provided for by the Lands Clauses Consolidation Act, 1845. In 1866, the Ryde Gas Company obtained an Act of Parliament, by the 77th section of which the rights of the commissioners to purchase the works were reserved conditionally that they were exercised within a period of five years from the passing of the Act. In February, 1871, the Corporation of Ryde (who had superseded the commissioners in the interval), gave notice to the company of their intention to purchase their undertaking, and required to be informed at what price the Company were disposed to part with it. The company expressed their willingness to sell, and the particulars of their claim showed that they included in the proposed sale the gas-works and the site thereof, as shown on the plan accompanying, and the plant, mains, pipes, and other apparatus belonging thereto or situate therein; also their reversionary interest on land, ground rents secured on land, which ground rents were of the annual value of £50, plots of land immediately adjoining the gas-works, not at that time required for the works, and five houses. They also included the right to purchase land adjoining their own, intended for the Isle of Wight Railway; but that part of the claim was abandoned, as shown by the award. Plaintiffs fixed the price for the above at £61,000, to which was to be added the value of stores and stock, cash, balances, and credits (unless reserved to the plaintiffs), surveyor's charges, and the like. The corporation considering the demand excessive, the matter went to arbitration in December, 1871, Mr. Cawley, C.E., acting for them, and Mr. Hawksley, C.E., on behalf of the company. Mr. H. A. Hunt was appointed umpire, and the arbitrators not agreeing, the decision fell to him. He made his award in writing, and determined that the sum to be paid for the absolute purchase of the fee simple and possession, together with all plant, mains, apparatus, the houses, plots of land, &c., the stock, stores, cash balances, and credits to be transferred, should be the sum of £58,443, the commissioners to pay interest thereon at the rate of 5 per cent. until the sum was paid. Plaintiffs contended that it was a valid and binding award, and that they were entitled to have it confirmed. They brought their action accordingly, and the defendants pleaded thereto. The first plea which was demurred to was the fourth. The defendants said that at the time of giving the notice to purchase, the plaintiffs were the owners of divers mains and pipes situated and laid in various places out of and beyond the limits of the borough, and out of and beyond the limits defined in the Ryde Improvement Act, 1854, and that they never agreed to purchase such pipes, and never appointed an arbitrator to value and fix a price for them. They alleged that the award included the price of various matters and things which they could not legally purchase—viz., plots of land, ground rents, houses, stores, and stocks, cash balances, &c., and also mains and pipes situated and laid outside of the borough of Ryde. They said that before the passing of the Ryde Improvement Act, 1854, and up to the time of the passing of the Ryde Gas Act, 1866, the plaintiffs were a joint-stock company formed by deed of settlement for the purpose of supplying Ryde and its neighbourhood with gas, without any special powers, but registered under the 7th and 8th Vict., and had works and mains in the town, but not elsewhere. By the Act of 1866 they obtained power, amongst other things, to supply not only the borough of Ryde, but the adjacent villages beyond the jurisdiction and control of the commissioners. The corporation, therefore, sought to set aside the award as void, for dealing with property which they could not, in the exercise of their powers, purchase.

Justice BLACKBURN: I suppose the first question is, was there authority on the part of the defendants? Had they a right under the Act to purchase all those things on which the award was made?

Sir JOHN KARSLAKE said it was. The power to purchase was originally given to Improvement Commissioners, but the town having obtained a charter of incorporation, the rights and powers of the commissioners were transferred to the Town Council, which was also the local board of the district.

Justice BACKBURN: Supposing the commission remained undissolved, whatever they could lawfully have done can now be lawfully done by the Town Council?

Sir JOHN KARSLAKE said the objection on the other side was that they could not do it as a local board; they might do it as commissioners, but because they described themselves in some notices as a local board they could not.

Justice BLACKBURN said a good deal of plaintiffs property was clearly acquired since 1854. Was there any finding or statement as to whether any portion was acquired since 1866?

Mr. MANISTY said it was stated that after the passing of the Act of 1866, and before the notice of 1871, the plaintiffs had become possessed of several plots of land.

Sir JOHN KARSLAKE submitted that what the corporation were empowered to purchase was the existing works, &c., of the company at the time the notice to treat was given.

Justice BLACKBURN: In 1854 the company *de facto* possessed nothing out of the town.

Sir JOHN KARSLAKE said they did not, but they had since necessarily extended their mains. The question was what was the meaning of "the existing works?"—whether it meant that all the corporation could be required to purchase was the existing gas-works, in the state in which they then were, or the gas-works as existing when the defendants said: "We want gas-works; will you sell your undertaking?" He submitted that defendants must offer to purchase all that existed at the moment of offering to purchase.

Justice QUAIN: If there were 20 retorts at the time of the passing of the Act and 40 when they wanted to purchase, are they bound to take the 40?

Sir JOHN KARSLAKE submitted that the words were clear at the beginning of the 85th section, and referred to the gas company, which must be expected to have altered their works more or less and have a saleable concern. The defendants were to purchase from them *all* their works, &c. It did not say "existing at this present moment;" it said that before constructing any apparatus, &c., they must serve notice, &c. Now, what would the notice state? You have certain gas-works in existence; we are willing to purchase your existing gas-works. It must be taken to mean substantially the same works, whatever the gas company had existing at the time the notice was given.

Justice BLACKBURN: Supposing that is so, what do you say to including rents, &c.?

Sir JOHN KARSLAKE: Supposing at the time the notice was given they had certain property much more extensive than that which existed in 1854, the notice must be. "We are willing to purchase your existing gas-works &c., and all other things belonging thereto."

Justice BLACKBURN intimated that the defendants offered to purchase what the plaintiffs had in 1854.

Sir JOHN KARSLAKE said the works existing in 1854 might be so altered and remodelled that they could not, as existing in 1854, be purchased. Supposing a gasometer, in consequence of the necessities of business, had been removed for a larger one, they could not sell the original area. Pipes would also have been renewed.

Justice BLACKBURN: No doubt pipes, &c., would deteriorate, and have to be replaced by others.

Sir JOHN KARSLAKE: And wooden buildings would be turned into stone ones, roofs altered, &c. If the plaintiffs were willing to sell, the defendants were bound to buy the whole of the undertaking, however the plaintiffs might have extended it.

Justice BLACKBURN: Although it may have been extended not for the benefit of the extended town, but for the purpose of supplying the country—the whole of the Isle of Wight—with gas, which the commissioners, or Local Board of Health, had nothing whatever to do with?

Sir JOHN KARSLAKE: Yes. The mains had been lengthened and extended out of the town, but were part of the Ryde Gas Company's undertaking.

Justice BLACKBURN: These villas and plots were acquired subsequently to 1866?

Mr. MANISTY: Yes.

Sir JOHN KARSLAKE: I do not find any suggestion that the land we hold is illegally held by us, so I must take it, it is legally held.

Justice QUAIN thought that the notice did not apply, but ought to apply, to all existing gas-works at the time it was given. His difficulty was with respect to taking the other property—villas, ground rents, cash balances and credits, stores and stock, surveyor's charges, and the like.

Sir JOHN KARSLAKE said there was nothing to suggest that that which the plaintiff held was held illegally. There was the reversionary interest on land, which he supposed was bought with the view of extending the works or some other purpose. It had been acquired as part of the undertaking. Surely there was nothing wrong in their saying, "We shall want to extend our works by-and-by; we have an opportunity of buying land which will be most important for that purpose, but in the meantime we let it out as grazing land."

Justice BLACKBURN: How can ground rents be gas-works? It may possibly

be a convenient way of disposing of superfluous funds—all very well for a commercial body.

Justice QUAIN: "They are also entitled to certain plots of land—the fee simple of, and ground rents secured on them."

Justice BLACKBURN asked the meaning of it.

Sir JOHN KARSLAKE said he was given to understand that the land was held on long leases with a reversion.

Justice BLACKBURN: They cannot be very easily used for the purposes of gas-works.

Sir JOHN KARSLAKE said that in point of fact anything which was legally held by the company was part of their property, and for the advancement of the interests of their body, and it was that which ought to be sold. That really was the substantial question in the case. But if this was *ultra vires*, there was the agreement to submit to arbitration. Both parties went before the arbitrators and consented that compensation should be assessed for everything. The corporation could not now retract their consent and say that because the notice was not strictly correct technically, therefore the award might be set aside.

Mr. MANISTY said the main question was whether the defendants had power to purchase of the plaintiffs property both within and without the borough, as well that which they had acquired before as that which they acquired after the passing of the Act of 1866? He ventured to submit that the Act of 1854 was, as it purported to be, an Act for regulating and improving the town of Ryde and providing a supply of gas and water thereto, and for other purposes, all coming within the government of the town and the convenience of the inhabitants. It never was intended to give, and had not given, power to purchase gas-works, or any property connected with gas-works, outside the town. It was never contemplated by the Act that the commissioners should purchase the mains and pipes within a radius of two miles and supply other villages and places, and carry on a concern of that sort as traders. It was expressly prohibited by the sec. 85. Their powers were limited—they could only supply within the limits of the Act. What was sought to be put upon the defendants was that they were to buy this large undertaking, which had increased since 1866, and though after they had bought it they could not use it, still they must pay for it.

Justice BLACKBURN thought it was only an implied prohibition and that what Mr. Manisty said was a forcible argument as to what the Legislature was likely to have done.

Mr. MANISTY said some pipes were laid prior to the Act of 1866; but far the greater portion of the property which defendants disputed about they said was acquired after. The Act of 1866 was obtained by the company, giving them a larger area over which they might exercise their powers. No doubt at the instance of the town and of the commissioners the 77th clause was introduced; but nothing in that Act was to prejudice or alter the operation or the effect of the 85th section of the Ryde Improvement Act, 1854. The plaintiffs had by their Act of 1866 become a totally different company, with their large powers of acquiring property not connected with the gas-works either within the town or out of it. That was utterly immaterial to the defendants, who had only power to buy gas-works for the purpose of lighting the town.

Justice QUAIN: The works then existing? If they extended a main one yard you would contend you are not bound to buy that?

Mr. MANISTY: I do not know that.

Justice BLACKBURN: Your contention is that in the award things are included such as their bad debts, credits, cash balances, ground rents, and villas, which in no sense can be said to be part of the gas-works, and which were acquired subsequently to 1866?

Mr. MANISTY: Yes, my lord; that is the point.

Justice BLACKBURN: What do you say to Sir John Karslake's point that a fresh agreement was made? Supposing it is true they did agree to it, will it support the declaration?

Mr. MANISTY: The declaration is based upon a submission according to the Lands Clauses Consolidation Act, and the award purports to be made in pursuance of this notice. Assuming that the arbitration was abandoned, what they now really were going for was to enforce the award under a new submission altogether. Although the plaintiffs said they were willing to sell those other things, the defendants never assented to it, but adhered to their original notice of the 14th of February all through. Simply, they said they would take the gas works. They appointed an arbitrator to value what was in the town; requested the plaintiffs to do the same, and they did so. Everything else was carefully excluded.

Justice QUAIN: And in respect of stores and stock, cash balances and credits, &c., I want to see whether on the face of the declaration there was any agreement to include them.

Mr. MANISTY: None on the face of the declaration, but subsequently, if they did agree, there was no right—no power to do it.

Justice QUAIN: The company say £6100, to which will have to be added the value of stores, &c., at the time of transfer, cash balances and credits, unless reserved, &c.

Mr. MANISTY: There is no agreement that they should be included. Another point is not a technical one, as my learned friend alleges, but is perfectly substantial. This was a submission by the Local Board of Health under the notion that as a local board they had the power.

Justice BLACKBURN: They were the same identical people. It is quite a sufficient expression.

Mr. MANISTY: I feel very strongly on the point, and could point out that it is substantial, very substantial. If they make a contract as a local board, they must do so according to the Local Board of Health Act. The defendants can only exercise the powers of the Act of 1854.

Justice BLACKBURN said if Mr. Manisty went into that point, Sir John Karslake would have to reply.

Mr. MANISTY said he would not raise it.

Sir JOHN KARSLAKE having replied,

Justice BLACKBURN, in delivering judgment, referred to the 85th section of the Act of 1854, and said upon the first point of contention the court were not obliged to decide—viz., whether the terms "existing gas-works," meant now existing, which, of course, would necessarily mean with such alterations as would arise from repairs to gas-works as existing in 1854, which might have been 50 or 100 years afterwards. Whether it meant gas-works then existing or now existing it was not necessary to decide. It was quite clear they were to give notice of their willingness to purchase the gas-works of the company, and they were only enabled to erect other works if the company for six months neglected or refused to convey to them their works at such a price as should be agreed upon or ascertained by arbitration under the Lands Clauses Consolidation Act. The council were to purchase those lands and things belonging to the gas company which they expressed their willingness to purchase, and which the company were willing to let them have, at the price so settled, but if they were saddled with an award for things they never agreed to buy, the award would be void and of no effect at all. It might very well be where there was a dispute, and the one party said, "You are bound to take this, and that, and the other thing—you are bound to take all;" and the other side said, "I am not bound to take all;" they might add, nevertheless, let the arbitrator go on and then see how it is; but they were never bound to pay for anything they were not bound to purchase. It seemed clear that the defendants never had expressed their willingness and never did agree to do anything more than purchase the gas-works, mains, &c., in the town. In their notice they said they confined themselves to that. Though the plaintiffs said in effect, "We are to sell the works, excepting what is outside," they intimated in the schedule that the corporation would have to take stores, cash balances, &c., but for all that there never was anything from beginning to end which showed that the defendants at any time agreed to buy them. When the award was made, it happened that the umpire named one lump sum, including not only those things which the corporation had stated their willingness to purchase (namely, the portion in the town, with the additions and increase of those), but even mains and pipes which were outside the town. Further than that, he included in the lump sum the value of ground rents, villas, &c.—in nowise a part of the gas-works—cash balances and credits, and things of which there was no pretence for saying that the defendants would in any way be under obligation to purchase if the price had been assessed separately. That was a sufficient reason in his mind for saying that the count was bad. When the different pleas were looked at, he thought the same answer arose—the same point seemed to dispose of them all. The demurrers were first to the count; the fourth plea was demurred to on the ground of the plea—that the defendants had never agreed to buy those things; that was in his mind perfectly good. There was a replication to it, "that before making his award plaintiffs and defendants consented and agreed," &c. (as above), but upon that replication it was not asserted at all that Mr. Hunt ought to take upon himself to decide whether they were to buy or not. The utmost that he decided was that he assessed the value, leaving the question of buying to be decided afterwards. It seemed to him that it was bad. Judgment must be given for the defendants upon that, for the same reason he had already intimated, that the defendants should be bound somehow to take a thing before they could be bound to pay the price which Mr. Hunt had assessed. The fifth plea was very much like the fourth, and the sixth was bad in substance. Then there was the seventh plea. There was a further replication on equitable grounds—plaintiffs and defendants consented and agreed, &c. There was nothing stated when they consented and agreed to the making of the award as to whether they should purchase or not purchase. If it had mentioned that it would have been a decided departure, but it did not amount to that. The 12th plea was really a special case setting out the whole; then the replication was the same, and there was a demurrer to the 12th plea; then a replication, &c. The 14th plea was stated to be bad in substance. Then came rejoinders, and then equitable rejoinders. He could only say this, that as the equitable replications were bad—totally bad—the equitable rejoinders were quite good enough for the replications. Plaintiffs said in their special rejoinder that the equitable replications to the defendants pleas were bad in substance, but he could only repeat that the one being totally bad, the other was good enough for it; and the result was that the defendants must have judgment in each one of these demurrers.

Justice QUAIN said he was of the same opinion. It appeared to him that the declaration was perfectly bad on the face of it. The sum was awarded to be paid on the absolute purchase of the fee simple and possession, and in respect of stores, stock, cash balances and credits, &c. He found no statement on the declaration that there was any agreement whatever to submit to the same arbitrator the value of the stores, stock, cash balances and credits, &c.; therefore on the face of the declaration it appeared to him the award was upon matters not submitted at all, but included in the value in one lump sum—a gross sum for the whole. The declaration was, therefore, bad upon the face of it. The only thing the declaration said was simply this: it recited that the claim was £61,000, to which would have to be added stores, cash balances, and, unless reserved to the plaintiffs, surveyor's charges and the like. There was no ground in the declaration for saying that they were ever submitted to the arbitration at all. It was expressly said "unless reserved," and there was no affirmation that it was reserved. He thought the umpire had awarded upon things not within his jurisdiction. If it could be read as including those things, he did not award upon all the matters submitted to him, for he left out all reference to the surveyor's charges, &c. He had either included in his award things not submitted to him at all, or if they were all submitted he had failed to award on them all. He could not conceive that there should be included ground rents and houses, which had nothing whatever to do with the gas-works, and, still more, cash balances and credits, and stores in stock. Stores in stock might be a little more doubtful, but the other matters certainly could not be as well described as belonging thereto, yet the award professed to deal with those things. He was of opinion that the corporation could not be bound to take those things, and whether or not they could consent to buy them he thought extremely doubtful. His opinion was that the pleas, to a very great extent, if not altogether, merely raised the question by affirmation—viz., that with regard to those various things which were not agreed to be submitted, with regard to consents, the replications arising upon consents were bad in substance. He thought they were all bad.

Justice ARCHIBALD concurring, judgment was given for the defendants on all points.

WEDNESDAY, NOV. 19.

(*Sittings in Banco, before Justice* BLACKBURN, *Justice* LUSH, *and Justice* QUAIN.)

PIMLICO, PECKHAM, AND GREENWICH TRAMWAY COMPANY *v.* GREENWICH UNION.—LONDON TRAMWAY COMPANY *v.* PARISH OF LAMBETH.

These two cases, which involved the same point, raised an important question as to the rateability of tramways.

Mr. H. GIFFARD, Q.C., and Mr. POLAND appeared for the Tramways Companies; Mr. FIELD, Q.C., and Mr. BULLEN for the Lambeth Parish; Mr. HORACE LLOYD, Q.C., and Mr. MEADOWS WHITE for the Greenwich Union.

On behalf of the tramways companies, it was argued that there was no exclusive occupation by them of any part of the soil, which occupation is necessary to impose liability for rates. The companies are authorized by their Acts to put down the tramways, and are given the exclusive right to use them with carriages having flanges. But all the rights of the public are reserved to use the surface of the tramways with carriages not having flanges, or for horses or foot-passenger traffic, in the same way as the road was used before the tramway was put down. It was contended, therefore, that the tramway companies had merely an easement over the road, and not any exclusive occupation of the soil.

The COURT, without calling upon the counsel for the rating authorities, gave judgment in their favour, holding that the case could not be distinguished from those in which gas companies and water companies had been held rateable in respect of their occupation of the soil by their pipes.

EDINBURGH COURT OF SESSION.

SECOND DIVISION.—TUESDAY, NOV. 18, 1873.

(*Before Lord Ordinary* GIFFORD.)

ALLIANCE AND DUBLIN GAS COMPANY *v.* CUNNINGHAM AND OTHERS.

This was an action against the trustees of the late James Ferguson, coalmaster, Auchin heath, Lesmahago, and Glasgow, to recover the sum of £1000 for damages alleged to have been sustained by the plaintiffs by reason of a breach of contract on the part of the defendants.

The LORD ADVOCATE, Mr. MILLAR, and Mr. TRAYNER appeared for the plaintiffs; the SOLICITOR-GENERAL, Mr. WATSON, and Mr. BALFOUR for the defendants.

The case for the plaintiffs was, that in February, 1872, they accepted an offer by Messrs. Ferguson and Co., to supply them with 1000 tons of gas coal throughout the course of one year, in parcels of 100 tons, at the price of 21s. 6d. per ton f.o.b. They allegedthat Messrs. Ferguson failed to deliver the quantity of coal in question.

On behalf of the defendants it was contended, amongst other things, that no formally concluded contract for 1000 tons of coal had ever been entered into between the gas company and Messrs. Ferguson and Co.; that the delivery of

1000 tons was contingent upon the approval by the plaintiffs of the 100 tons trial cargo, and that they never approved of that cargo.

The LORD ORDINARY, before whom the case was tried in the Outer House, issued an interlocutor, finding that, according to the true construction of the contract between the plaintiffs and defendants, the sale of 1000 tons of gas coal was conditional, and subject to approval by the plaintiffs of a trial cargo of 100 tons, which were to be furnished in addition to or separate from the 1000 tons. He therefore found that the plaintiffs failed to take delivery of the trial cargo, although offered to them under the contract, and failed to intimate any approval thereof, or to intimate that they waived the condition of approval, or held that the bulk was approved till 31st of July, 1873, being upwards of five months after the contract was made. He also found that this delay on the part of the plaintiffs was undue, and that the defendants were thereupon entitled to refuse to supply the 1000 tons of gas coal.

The charge of breach of contract was therefore negatived, the defendants exonerated from the claim, and the plaintiffs were held liable in expenses.

The gas company appealed against this decision, but it was this day confirmed with costs.

HAMMERSMITH POLICE COURT.—FRIDAY, NOV. 21.

(Before Mr. BRIDGE.)

THE GASLIGHT AND COKE COMPANY *v.* O'BRIEN.

The defendant in this case, Major *O'Brien*, of Royal Crescent, Notting Hill, was summoned for non-payment of £5 5s. 3d., due to the plaintiffs for gas supplied to him at his former residence in Lansdown Road. The plaintiffs charge was based on the award of the commissioners appointed by the Board of Trade under the Act of 1868. The defendant pleaded that he was not bound by that award (which was made after he ceased to take the gas), and that he was bound only by the terms stated on his meter card. The case was heard in the first instance on the 12th of November, when the company not being represented by counsel an adjournment until this day was granted.

Mr. BESLEY now attended on behalf of the plaintiffs; the defendant was represented by Mr. CRUMP.

Mr. BESLEY said as the magistrate was no doubt familiar with the general course of legislation affecting the gas companies of the metropolis it was only necessary that he should briefly allude to the position of the plaintiffs. By the Metropolis Gas Act of 1860 separate districts were assigned to the various gas companies in London, and amongst these the plaintiffs, who were called the Chartered Gaslight and Coke Company and the Western Gas Company, had each a district assigned them. By a subsequent Act, passed in the year 1868, powers were given to the Chartered Company and others to carry out a scheme of amalgamation, and the mode by which such amalgamation should be brought about—viz., an Order in Council—was pointed out. Under the provisions of this latter Act an Order in Council was made on the 27th of November, 1872, for amalgamating with the Chartered Company the undertaking of the Western Gas Company. Section 4 of the scheme so sanctioned, which had all the authority of an Act of Parliament, declared that "all purchases, sales, conveyances, securities, agreements, and contracts before the commencement of this scheme, made or entered into under the authority of any Act or Acts relating to either of the amalgamating companies, shall be as valid and effectual to all intents and purposes, for, against, and with respect to the united company as if the same had been made and entered into with the united company instead of with either of the said amalgamating companies." From the 27th of November last the plaintiffs became by the amalgamation possessed of all the rights which the Western Company had possessed under any contract with the consumers of the Western Company's district. On the last hearing of this case it was denied that Major O'Brien had ever signed a contract with the Western Gas Company. But such a statement must have been made in mere forgetfulness, for he (Mr. Besley) held in his hand a contract in the following words:—"I, John O'Brien, request you to supply with gas the premises No. , Lansdown Road, in the parish of Kensington, on your usual terms, endorsed hereon; also to furnish me with a 10-light meter, and I agree to pay your gas-rate of 5s. 6d. per 1000 cubic feet, or other the gas-rate for the time being, and a meter-rent of 2s. 6d. per quarter." And there was a provision added to the effect that the consumer was to use and pay for the gas until the expiration of at least one calendar month's written notice of removal or discontinuance, and that if notice was not given the consumer would remain liable. No doubt it was an oversight that Major O'Brien did not give that notice when he left the Lansdown Road, and did not comply with what he had undertaken to do.

Mr. CRUMP: My client did give a written notice to the company.

Mr. BESLEY: I am told there was no written notice.

The MAGISTRATE: That is another matter. I understand the gas charged for was undoubtedly used by him between January and the 7th of April.

Mr. BESLEY: Yes. I understand that a mere verbal notice was given.

The MAGISTRATE: Practically it does not matter in the least.

Mr. BESLEY said the contract which he had read was dated in March, 1870. It was made between the Western Gas Company and the defendant, the gas to be charged at the rate of 5s. 6d. per 1000 cubic feet, "or the rate for the time being." Now, from March, 1870, onwards, Major O'Brien had different rates put upon him. When the Western Company could afford it they charged him a less price—it varied and fluctuated. And here he might make an observation—viz., that it appeared to be thought that because the plaintiffs had had to apply to the Board of Trade for power to charge a higher rate for cannel gas supplied in this district than had been charged before, that therefore they were to blame in the matter. But the fact was that the price of coal had nearly doubled, and the company found that they could not pay their shareholders the dividends they were entitled to receive unless they were allowed to charge an increased price. The provisions of the Act of Parliament were clear enough as to the mode in which this advance should be obtained. The company were obliged to go to the Board of Trade and ask to have three commissioners appointed to inquire into the circumstances of the case, and on such an inquiry the Metropolitan Board of Works and the Corporation of the City of London were entitled to be heard in opposition.

The MAGISTRATE: This is not a matter which enters into my consideration. I must assume that the Board of Trade have properly exercised their duties.

Mr. BESLEY said it was an observation made by him rather in the hope that it would reach the ears of the "Vigilance Committee," by whom this case was defended. He wished these gentlemen to know that the plaintiffs had the same interest in the matter that all their consumers had, and that they would not charge more for their gas than was necessary. On the other hand, they would never be able to make any reduction of price if they were put to needless expenses, because all the money paid by them in litigation was carried to account, and would have to be credited to them when they went every year to the Board of Trade. The committee were therefore making a whip for their own backs. As he had before remarked, here was a contract signed by the consumer.

The MAGISTRATE: Probably Mr. Crump will not deny that this is a proper contract.

Mr. CRUMP: No; I go upon that contract.

Mr. BESLEY: The terms are "at the rate of 5s. 6d. per 1000 cubic feet, or other the gas-rate for the time being." If you accept this as a contract, then I think there is an end of the case.

Mr. CRUMP: No. Assuming that this is a contract binding upon us, I go beyond that.

Mr. BESLEY: No doubt it is a contract.

The MAGISTRATE: No doubt.

Mr. BESLEY: I am relieved from the necessity of saying anything upon the meter-card. That is clearly not a contract in any shape or form.

The MAGISTRATE: The contract is to pay "the gas-rate for the time being;" and the question is whether the meter-card does not state what is "the rate for the time being."

Mr. BESLEY: Even if it were a statement, unless it were an absolute contract, it could not do away with the Act of Parliament.

The MAGISTRATE: What is the rate for the time being? The rate they have a right to charge. I suppose the company have a right, within the limits of the Act of Parliament, to say, the price of gas shall be so-and-so, for the next three months. Then the question is whether they can, having given notice that the rate is 5s. 6d., by an *ex post facto* act of the Board of Trade say the rate shall, for those three months, not be 5s. 6d., but 6s. 3d.

Mr. BESLEY: What I contend is that you may dismiss the meter-card from consideration altogether. It is nothing more than a convenient schedule to mark upon what the consumption of gas has been. But, as a matter of fact, I shall prove to you that the card never got into Major O'Brien's house until the 5th of April last.

The MAGISTRATE: The statement last time was that the meter-card was delivered on the 27th of December.

Mr. BESLEY: I will undertake to prove to you that on the 5th or 7th of April the man who went to Major O'Brien's house, and took away the Western Company's meter-card, copied the figures from that card on to this, and delivered it then, and not a day sooner. So that, with respect to Major O'Brien, the effect of any statement on the card, if any, is gone, except as to about 200 feet of gas. I suppose it would not be worth while, therefore, to discuss that question in a superior court. In fact, we would rather take your order for that than litigate the question, the cost of which must fall on the consumers.

The MAGISTRATE: What was stated last time was that a notice was issued to the consumers of an application to be made to the Board of Trade to raise the price of gas, and that from the 1st of January the price would be 5s. 5d., or such price as might be sanctioned by the board.

Mr. BESLEY: That was on the 16th of December.

The MAGISTRATE: The question is whether that notice was brought home to Major O'Brien.

Mr. BESLEY: I shall ask you whether a notice was required at all—whether everybody is not supposed to know the law.

The MAGISTRATE: The application to the Board of Trade was to fix the maximum price.

Mr. BESLEY: The Act says, "The commissioners so appointed shall, after hearing the company and the corporation, if desiring to be heard, fix an illuminating power and a price for that company, to take effect as on and from the 1st day of January in the year of revision."

The MAGISTRATE: The company go to the Board of Trade and ask, not what shall be the actual price, but what shall be the maximum price. The actual price is in their own option.

Mr. BESLEY: The words are, "fix an illuminating power and a price."

The MAGISTRATE: But look at the former section. It says: "The maximum price chargeable by a company for gas shall be as follows." All the commissioners did was to fix the maximum, and not the price.

Mr. BESLEY: They fixed *the* price—because you will find there is a provision in favour of vestries, that they are to pay the lowest price.

The MAGISTRATE: How do you read the former section, under which the price is fixed before the company go to the Board of Trade?

Mr. BESLEY: The 56th section says: "The maximum price chargeable," &c.

The MAGISTRATE: That is before they go to the Board of Trade.

Mr. BESLEY: In the very order of the commissioners themselves we have the words, "we hereby certify that by virtue and in exercise of the authority vested in us under the said Acts, and in accordance with the terms thereof, we have fixed and we do hereby fix an illuminating power and a price for The Gaslight and Coke Company, to take effect at and from the 1st of January, 1873, and for the year 1873 as follows:—*i.e.*, the maximum price chargeable by The Gaslight and Coke Company for cannel gas of an illuminating power of not less than 23 candles shall be at the rate of 6s. 3d. per 1000 cubic feet."

The MAGISTRATE: This shows that the commissioners understood "price" as if the word "maximum" had been written before it.

Mr. BESLEY: Whether they did or did not, so long as the price is to be fixed under the law, no notice surely is necessary to the consumer.

The MAGISTRATE: If the meaning is that the law fixes the maximum price, the price the company intend to charge may be lower according to notice. There is a maximum fare on a railway, but that does not show what the fare actually is.

Mr. CRUMP: My learned friend says something about no notice being required. By the 40th section of the Act of 1860 it is provided that "no company shall advance the price of gas"——

Mr. BESLEY: You need not read further; that section is repealed.

Mr. CRUMP: You are arguing that no notice is required.

The MAGISTRATE: I think I had better hear Mr. Besley first.

Mr. BESLEY: The appeal to the Home Secretary under the Act of 1860 is repealed.

The MAGISTRATE: What I mean is that the commissioners in the construction of this section have taken the word "price" as the "maximum price" in the same way as in the other section, and they fix what is to be the outside price the company may charge. What they do charge may not be that price.

Mr. BESLEY: The commissioners give a price as on and from the 1st of January.

The MAGISTRATE: And the company can write and say to their consumers, "We shall fix your price from the 1st of January at the maximum which the commissioners allow," or "we shall fix it at 6s. 6d," supposing that is not greater than the maximum price.

Mr. BESLEY. Need they give notice to a man who has contracted that he will pay "the gas-rate for the time being"?

The MAGISTRATE: What is the price for the time being?

Mr. BESLEY: The maximum. Here is a contract by a man who agrees to pay the rate for the time being. In 1860 that rate was 5s. 6d., now it is 6s. 3d. The Act of 1868 gives power to revise the price; provision is also made for counsel to be heard against the application for revision, and it is enacted that the revised price shall take effect as and from the 1st of January in the year of revision.

The MAGISTRATE: I understand you to say you can prove that this meter-card was not delivered until the 5th of April, and that the notice that the rate might be altered was given on the previous 16th of December. If you prove those two things I shall be with you.

Mr. BESLEY: If you should think there was a failure of the notice of the 16th of December, I shall submit that I am not bound to give any notice. The section 40 of the Act of 1860, which requires notice of an intended advance in price of gas to be given to the local authorities of a district, is repealed, and in lieu thereof we have, by the Act of 1868, to give notice to the Metropolitan Board of Works upon any application to the Board of Trade to revise our rates. Inasmuch as the Act points them out as the local authority which is to be heard by counsel against such application, I submit that no other notice was necessary. We spent £4000 on this revision to demonstrate to the Board of Trade that, with coals at double their former price, we were entitled to an increase in our rates. If the power in this Act means anything, it must mean that the con-

sumers are to have their gas at the rate fixed by the commission. Any other construction would be to take away the effect of the Act of Parliament. There is no provision under the Act of 1868 for local authorities to be heard against the application of a company, and I submit that no notice is necessary to the consumers; but if I prove the notice of the 16th of December, it will be so far an advantage. It was no fault of this company that the revision did not take place till April. They applied to the Board of Trade on the 28th of January; on the 10th of February commissioners were appointed, and until the 25th of April the company were engaged in the contest with the Metropolitan Board and the City of London, when all these facts were gone into. Another year, perhaps, the matter will not take so long; but I can only say it was not our fault that the consumers did not know until the 16th of April what the price of gas was to be.

The following evidence was then given :—

Mr. *Sidney Ball*, examined by Mr. BESLEY.

I am an inspector in the service of The Gaslight and Coke Company. Previous to the 27th of November, 1872, I was in the service of the Western Company. I produce the contract for the supply of gas to Major O'Brien's house in the Lansdown Road. It is signed by myself as witness to the signature of the defendant on the day named. The gas was supplied to him by the Western Company from that date up to the time of their amalgamation with the Chartered Company on the 27th of November, and Major O'Brien paid the accounts from time to time. I think during the period he was supplied by the Western Company, the price of gas was reduced from 5s. 6d. to 5s.

The MAGISTRATE: Under which Act did the Chartered Company go to the Board of Trade?

Mr. BESLEY: Under the City of London Gas Act, 1868, sec. 57, which is made applicable to the districts supplied by this company outside the City by the private Act of their own of the same date, sec. 109. This Act did not become applicable to the Western Company's district until November, 1872.

Examination continued: The gas-rates were altered from time to time, and Major O'Brien has paid them as so varied. I went to his house on the 31st of December last, and left a copy of this notice. (This was the notice dated the 16th of December, issued by the plaintiffs to the consumers, announcing that from the 1st of January the illuminating power of cannel gas would be increased to 23 candles, and the price charged would be 5s. 5d. per 1000, or such price as might be approved by the Board of Trade.) I have no memorandum made at the time of the delivery, but I have a book relating to all my portion of that district, and I know that I left a notice at every house. I went there to take the state of the meter. The next time the meter was taken was on the 5th of April. I did not go myself on that day, and know nothing about the card produced. I was not present when the defendant's gas was cut off. I saw the meter when it was brought to the works. The consumption between the 5th and the 7th of April was 200 feet. The expense of cutting off was 2s. 6d.; the meter-rent due was 2s. 9d. There was shown to have been a consumption between the 1st of January and the 7th of April of 16,000 cubic feet, of which 200 feet was the consumption of the last two days.

Cross-examined by Mr. CRUMP: There is no mistake in saying I left the notice on the 31st of December. It is dated the 16th of December. I gave it to the person to whom the gas bill was given. I went in to take the state of the meter, and I handed the notice to whoever it was I saw. I did not leave a meter index card at the same time. The gas bill stated that the consumption to the 31st of December was 16,400 feet, but there was no price affixed.

Mr. *William Turner*, examined by Mr. BESLEY.

I am an assistant to Mr. Ball. I went to Lancaster Road on the 5th of April to the defendant's house. I took the state of the meter and left a meter-card with the consumption on it. This is the card. The figures 457 are in Mr. Ball's writing.

Mr. *Ball* recalled: The top line of figures is mine. These meter-cards were made out at my house before the last quarter.

The MAGISTRATE: You did not leave it at the defendant's house when you took the state of the meter in December?

Witness: No; we did not have the cards then. I never saw this card till March. Until March this [producing a paper] is the form we used. I swear that I did not put in these figures before March.

The MAGISTRATE: It is strange that the company did not put on these cards "such price as the Board of Trade may approve."

Mr. BESLEY: This is the act of a servant without authority.

Examination continued: I gave this card to the last witness to deliver. It was to be taken by him when he took the state of the meter.

Cross-examined by Mr. CRUMP: I received these cards from my chief inspector, Mr. Carter. I swear that I never saw them till the commencement of March.

William Turner recalled: I delivered the cards in Lancaster Road on the 5th of April, the day that I took the meter index.

Mr. BESLEY proposed to call Mr. Frank Bush to prove the Order in Council, but

The MAGISTRATE said that was not denied.

Mr. CRUMP: I cannot deny it. Do you prove any resolution of the board of a purpose to carry into effect the award of the commissioners?

Mr. BESLEY: No, not at all.

Mr. CRUMP: Are you going to give any evidence of an authority by the company to charge this price?

Mr. *W. H. Friend*, examined by Mr. BESLEY.

I received the address of Major O'Brien. My father made out the invoice. This is a copy of it. When made out it was posted to 22, Royal Crescent. I called afterwards myself and applied for the money. I never saw the defendant. The first three or four times I received no answer. The last time I saw Mrs. O'Brien, and she said they disputed it on account of the price.

Mr. BESLEY: That is our case.

Mr. CRUMP said he did not see at present any resolution come to by the gas company fixing the price which the consumers were to be charged. His learned friend had proved nothing except that a bill was issued, but there was no evidence of any resolution come to by the company in pursuance of the award of the commissioners; and in the absence of that it was perfectly open to him to say that this price was an arbitrary charge entirely. There was no evidence that the company were parties to these proceedings. There was no evidence of a meeting held by the board of directors to fix the price. They had been told that the Board of Trade appointed commissioners who fixed a maximum, and therefore the officers of the company immediately made a charge of that maximum price to the consumers. This was a thoroughly arbitrary proceeding. There was no resolution to show that the board met, or of anything beyond the mere issue of a bill to the consumers claiming a certain amount of money. In an ordinary civil case, if a man was sued for calls by a company, they would produce a resolution authorizing such call, and thereupon he would become liable to pay. But here was a company having the right to exact 10 per cent. upon their capital, and they claimed simply upon the award of the commissioners, and without any act or resolution of their own to charge the consumers such a price as would pay this 10 per cent. This, as he submitted, was an irregular mode of proceeding, and one which could not be justified by the Act of Parliament. If it was to be held that without any resolution to act upon the award of the commissioners, and without any but the vaguest general notice to the consumers, they might be liable to pay any "gas-rate" for the time being, a company could claim to be entitled to go back to the 1st of January and charge an increased rate to that which hitherto had been charged, he submitted that it was a most unjustifiable proceeding, and certainly illegal. There was no possible ground to support the claim of the company on this preliminary ground. If the bench was against him, and should hold that there was authority to the officers of the company to issue this bill, and thus bind the consumers to pay a price which was not fixed by the award for four months afterwards, he should ask to have a case stated for the opinion of a court of law.

Mr. BESLEY: There is no obligation upon the company to pass a resolution as to the way in which they will deal with the award. But the fact is, we sent them a notice that from and after the 1st of January the price would be 5s. 5d., "or such price as may be approved by the Board of Trade."

The MAGISTRATE: The objection is that though there was a power to fix this maximum price, there is no evidence that the company have authorized this price to be charged.

Mr. BESLEY: There is Mr. Friend's evidence; he is a servant of the company. He was not cross-examined.

Mr. CRUMP: The last time I cross-examined him as to the award of the commissioners, and I submit that that is sufficient.

The MAGISTRATE: I think they should be allowed to supplement that evidence, because, in point of fact, there was an authority from the board to charge the price.

Mr. CRUMP: There may be, but there is no evidence of it.

Mr. *W. H. Friend* recalled: I am a collector in the service of the company, and have been so for nine years. To me was entrusted the duty of making out the bills for the consumers in this district.

Mr. BESLEY: By what authority did you fix the price?

Witness: The accounts were given me at the office of the company at a certain price.

Mr. BESLEY: You received your directions from the chief office of the company?

Witness: Yes.

Mr. BESLEY: You did not attend the board meetings?

Witness: No. All the invoices contained the red printed notice on them. I posted a notice like this to Major O'Brien.

Mr. CRUMP: Are there any minutes of the board?

The MAGISTRATE: I shall adjourn the case if you persist on this point. It is not the point in the case. I shall adjourn the case for a week.

Mr. BESLEY: Do you think we are under an obligation to show a resolution of the board to act on the award?

The MAGISTRATE: I think the point may have something in it, but I do not think it is a point which should be taken. It is not the point of the case. The question is, whether the company have the right to charge without doing so. They have in reality sanctioned it, and no doubt they can now pass a resolution to make it good.

Mr. CRUMP: I am instructed by a body of gentlemen, whom I represent, and who are simply interested in seeing that the affairs of this company are administered regularly.

The MAGISTRATE: I quite understand. In all matters of substance it is important, but in all matters of mere form it is not worth while.

Mr. CRUMP: The gentlemen who instruct me are of opinion that the infliction of the charge of 6s. 3d. upon the consumers cannot really have had the approval of the board, and they want to see that this was properly discussed.

The MAGISTRATE: I have suggested what I think is right, and if there is an adjournment I shall make the defendant pay the costs of the adjournment.

Mr. BESLEY: It is absurd to suppose we should go to the Board of Trade without acting on their award.

The MAGISTRATE: But suppose the proper construction is that what the commissioners fix is the maximum, and not the actual price, then by a resolution or something of that sort the directors should fix the price.

Mr. CRUMP (after speaking with his clients) said his clients, upon consideration, would let the case go on. He then addressed the bench for the defence. He said he should call no evidence, but would direct the attention of the magistrate to the section of the Act of Parliament, which he thought made it perfectly clear that it never was the intention of the Legislature to permit a gas company to inflict upon the consumers, whether in the metropolis or elsewhere, an increased price for gas without notice.

The MAGISTRATE: On the last occasion I expressed an opinion upon this point. I said the consumers ought to have had notice, and this notice I said would be good if it was not superseded by the subsequent one represented to have been left on the 7th of December. Then it was said the card was left on the 27th, but it was not specially brought under the attention of Major O'Brien.

Mr. CRUMP said he should submit that unless the notice was brought home to Major O'Brien, or to some one who would communicate it to him, it was no notice at all. Then again, by the card having been delivered before he ceased to be a consumer, and before the award of the commissioners, the price was fixed to him up the 7th of April. A mere notice of change of price left at a house was not sufficient. The Act of Parliament never contemplated that consumers should be thus at the mercy of the gas companies, and he would show that something in the nature of a public notice was intended to be given. The 40th section of the Act of 1860, although repealed, showed what was the obvious intention of the Legislature, and imposed upon gas companies the duty of publishing any change about to be made in the price of gas. Parliament, according to that Act, considered it to be essential that notice should be given.

The MAGISTRATE: That was when the company were about to alter the price of their own accord.

Mr. CRUMP said it was in the case of an increase with the assent of the local authorities; and even when the price was raised by arbitration they were still bound to give notice. And, moreover, in the case of a reduction of price, which was a matter in favour of the consumer, it was provided by the Act of 1868 that the Board of Trade might, on the recommendation of the referees, and with the consent of the gas companies and the corporation, reduce the price, "notice whereof shall be given in the *London Gazette*." It was clear, therefore, that due notice ought to be given to the consumers. Then as to the question of price itself. Under the Act of 1860 arbitrators might be appointed to increase it, and the Act of 1868 gave power to the Board of Trade to appoint commissioners for a like purpose, whose duty it was to fix the maximum price to be charged. But he (Mr. Crump) could see nothing in that Act which gave power to the company to charge, as and from the 1st of January in any year, the full maximum price so fixed. The only course open to the gas company if they intended to do so was this: The Act of Parliament provided for a revision of price in each year, from January, 1870, and if the company had wished to do so they might have said before the commissioners, "We intend to charge the maximum price, whatever that price may be fixed at." Then they would have been safe, for the consumers would know that whatever price the commissioners fixed would be the price charged to them.

The MAGISTRATE: There is no limit as to what price the Board of Trade may fix?

Mr. CRUMP: I believe the limit is 7s. 6d.

The MAGISTRATE: They are to raise the price so as to give the shareholders 10 per cent. If necessary they may raise it to £60—I do not see why they may not, under the Act of Parliament.

Mr. BESLEY: There is no doubt about it.

The MAGISTRATE: I understand Mr. Crump to put it that there is a limit beyond which they cannot go.

Mr. CRUMP: I was under the impression that the company had only power to go to 7s. 6d.

Mr. BESLEY: That is repealed.

Mr. CRUMP: It does not affect my contention, which is that they ought to have given notice of their intention to charge 6s. 3d., or such smaller sum as the commissioners might fix. Then the company would have been protected, and could recover the amount. But when they issue a notice saying, "Our price at present is 5s. 5d., or such other price as may be fixed by the Board of Trade," they place themselves in a false position. The simple fact that the Act of Parliament says the award of the commissioners shall take effect from the 1st day of January does not affect the contract. It might happen that one of the commissioners died, and the award not be given until the 31st of December. It would be absurd to suppose that any price which the commissioners might then fix would be chargeable on the consumers for the whole year.

The MAGISTRATE: The facts of this case are very much changed since the last time it was before me, because now I think it is clear that the printed notice was left at Major O'Brien's house in the same manner as the other notice of the company was left, and this I take to be good evidence of notice of the rate being raised. I think the meaning of the Act of Parliament is that, though the commissioners do not make their award till long after January, the power of the company to charge under the award takes effect as and from the 1st of January in each year. I should say the intention of the Act was that the commissioners should give a maximum price, and that then the directors are bound to fix a price within that maximum, and to give notice thereof to the consumers. The notice they gave that the price to be charged would be "such price as may be approved by the Board of Trade," I think was not strictly accurate; it should have been "or the maximum price approved by the Board of Trade." But I do not know that the notice need be drawn with absolute precision, and I think that this notice did give sufficient intimation to the persons who had the gas. There is, therefore, nothing illegal in charging Major O'Brien the maximum price fixed by the Board of Trade. The argument of Mr. Crump seems to me an argument which points to the extraordinary nature of the Act, and might be well used before Parliament. In this case there must be an order for the amount claimed by the company, less the two sums knocked off last time.

Mr. BESLEY said he would not ask for costs against the "Vigilance Committee." His clients had no wish in this matter than that the consumers should understand that their interests were identical, and that they would not charge a higher price for gas than the circumstances required.

DUBLIN SOUTHERN DIVISION POLICE COURT.

SATURDAY, Nov. 22, 1873.

(*Before Mr.* BARTON.)

CHARGE OF EMBEZZLEMENT FROM THE ALLIANCE GAS COMPANY.

Joseph Fagan, cashier of the Alliance Gas Company, was brought up in custody charged with having embezzled sums amounting to £358, the property of his employers.

Mr. MARTIN, who appeared for the company, said that for the last 25 years the accused had been in the employment of the company as cashier, and very recently suspicion fell upon him of abstracting certain of the funds, and on the previous day, as far as could be proved, it was found to be absolutely certain that the sum of £358 had been embezzled. On being taxed with it, the prisoner admitted the defalcation.

Mr. *William Francis Cotton* said he was the acting secretary and manager to the Alliance Consumers Gas Company. He recently investigated the accounts of the prisoner, who had been employed as cashier. He first discovered the defalcations on the 16th of October, by seeing that the sum paid by the Exhibition Palace to the company had not been credited by the prisoner in his book.

Mr. BARTON: How did you discover it?

Witness: I sent a collector for the cash, and he returned with the answer that the money had been paid, and produced the receipts, which he had obtained from Sir Edward Lee, the manager. There ought to have been a block receipt in the prisoner's ledger, but it was not there. This block receipt was afterwards found on the prisoner's person by Acting-Inspector Doyle. On Thursday witness spoke to prisoner in reference to the matter, and, after a few moments, he admitted that he had received the £97 7s. 2d. I said it was better for him at once to tell the board of it, and to tell if he had taken any more. He said he would. I received the memorandum (produced) from him. The prisoner, on being questioned by me, said he had taken this money, but no more. The prisoner afterwards gave me a document in his own handwriting, which was an admission that he had embezzled sums of money of £144, £57, and £60, from the Paymaster-General, and £98 from the Exhibition Palace, the account making in all the sum of £358. The prisoner received from the War Office £1494 9s. 1d., and returned in his cash-book £1350 9s. 11d. That entry was dated the 14th of May.

The prisoner was remanded until the 27th ult.

Mr. WHITE applied that the prisoner be admitted to bail, taking into consideration the respectable position which he held, and his hitherto unimpeachable character.

Mr. BARTON said he did not think he would be justified in consenting to the application.

THURSDAY, Nov. 27.

The prisoner was brought up for further examination this day, but Mr. Martin, his solicitor, applied for another adjournment, on the ground that his client had not had an opportunity to retain counsel.

Mr. MARTIN did not object on the prosecution. He said the company had no desire to press the charge severely against the accused, and as no further defalcations had been discovered, he would not oppose the application if it met the approval of the court.

The case was then adjourned for a week.

DUBLIN NORTHERN DIVISION POLICE COURT.

THURSDAY, Nov. 27.

(*Before Mr.* C. J. O'DONEL.)

CHARGE AGAINST A GAS CONSUMER.

Fenton Delany, a shopkeeper in Upper Gloucester Street, was summoned, at the instance of the Alliance and Dublin Consumers Gas Company, for disconnecting the meter upon his premises without notice to them, and for reconnecting the pipes so as to burn gas which was not registered. He was also charged with obstructing the company's officers, and hindering them from examining the meter during a reasonable hour of the day.

Mr. BYRNE, who appeared to prosecute, said the company merely wished to have a penalty inflicted for the obstruction to the company's servants, and for disconnecting the meter without notice. It appeared that the gas company were made aware of the disconnexion by means of an anonymous letter, which came to them on Tuesday.

Mr. *John Cummins*, gas inspector, deposed that he went to the defendant's house on the 28th of October to examine the meter, but was refused admittance. Next day he went again, and saw the meter, which appeared as if it had been taken down. It was usual for consumers to send word to the company if a meter had by any accident to be taken down, and they would send a man for that purpose.

Mr. *Cotton* (secretary of the company) corroborated the last witness. He said the company wished to put a stop to a system, which was extensively carried on, of disconnecting the meter from the inlet-pipe.

Mr. WHITE, who appeared for the defence, stated that an injury had occurred to the meter on Saturday night, and that the defendant at once sent for a plumber to remedy the defect; that there was no intention whatever of fraud, as he simply wished to have his shop relit at once.

Mr. MATTHEWS, the plumber, deposed to having mended the meter-pipe by cutting off half an inch, and to having stated to defendant that if he was going across town on Monday he would give notice to the gas company.

Mr. WHITE contended that there was an entire absence of any element of fraud in the case.

Mr. O'DONEL said it was the duty of the defendant to communicate with the company the morning after the meter was disconnected, and that he was burning gas without its being registered. That would have cleared him of all suspicion. He felt bound to inflict the full penalty for each offence proved—viz., £2 for the disconnexion without notice, and £5 for the obstruction to the company's servants. The property of the company would not be safe if the responsible officers were obstructed in going freely and examining meters.

BIRMINGHAM COUNTY COURT.—TUESDAY, Nov. 25.

(*Before Mr.* H. W. COLE, Q.C., *Judge.*)

NEGLIGENCE IN REPAIRING A ROAD AFTER REPAIRING PIPES.

The plaintiffs were Messrs. Sutton and Co., railway carriers, and the defendants the Birmingham Water-Works Company. The action was brought to recover £33 7s. 6d., damages alleged to have been sustained by reason of the negligence of the defendants servants.

Mr. ROWLANDS appeared for the plaintiffs; Mr. DUKE for the defendants.

Mr. ROWLANDS, in opening the plaintiff's case, stated that, on the 27th of June last, one of their parcel carts was being driven along Northwood Street, when the horse suddenly sank into the ground, causing it to fall, thereby injuring its knees and shoulder. The cause of the horse sinking was that there had been a leakage from the water-pipes in the street, and that the company's men had repaired it. Twenty minutes after it was repaired, however, there was a fresh leakage, and he argued that it was apparent that the company's men did not replace the soil properly, as the horse sank in directly it stepped upon the place.

Mr. *George Southey*, the plaintiff's agent, proved that the horse was laid by for a week, and that a veterinary surgeon had to be called in to see it. It was also stated that the horse had very much deteriorated in value in consequence of the injuries.

For the defence, it was urged that the company were not liable at all for the damage, but his honour ruled otherwise. Mr. Duke argued that the damages were excessive; and in the end his honour gave a verdict for the plaintiffs for £6s. 7s. 6d.

KINGSTON COUNTY BENCH.—THURSDAY, Nov. 30.

(*Before Messrs.* HARRISON *and* RANYARD.)

EAST MOULSEY LOCAL BOARD *v.* LAMBETH WATER-WORKS COMPANY.

In this case a summons had been taken out against the defendants upon the information of the clerk of the local board, for not properly repairing and making good 1146 yards of the Walton Road, the same having been broken up by them in the course of the year 1871, for the purpose of making a conduit from their works at Surbiton. The work was completed in August, 1872, and the company having neglected or refused to make good the road, the local board caused it to be repaired at a cost of over £200. The defendants, though requested to do so, had not repaid the money as required by statute.

Mr. PATCHETT, who appeared for the local board, having stated the case,

The Hon. Mr. THESIGER, Q.C., who represented the company, submitted that the bench had, under Jarvis's Act, no jurisdiction to make an order for expenses, unless that order was applied for within six months of the offence being committed.

The MAGISTRATES deemed the objection fatal, and declined to hear the case further.

On Monday, the 24th ult., Mr. PATCHETT moved the Court of Queen's Bench for a writ of *mandamus* against the justices of the County Bench to compel them to proceed with the summons, and ascertain and fix the amount of money expended by the local board in repairing the Walton Road, the Lambeth Water Company having failed to do so as required to the satisfaction of the board. The court granted a rule, and cause will be shown on the first day of Hilary term next.

BATLEY POLICE COURT.—WEDNESDAY, Nov. 19.

(*Before the* MAYOR *and other* MAGISTRATES.)

DEFRAUDING THE GAS COMPANY.

Thomas Turner, currier, was charged with connecting a gas-pipe in a house he occupied with the mains of the Dewsbury and Batley Gas Company, without their consent, and using gas without it having passed through the meter. He pleaded guilty. Defendant had rendered himself liable to a penalty of £5, in addition to 40s. per day for every day in which he continued to use the gas without a meter.

The bench had no alternative but to impose the full penalty, but suggested that the company should consider whether or not they could mitigate the fine. Mr. Craven promised to bring the matter before the directors at their next meeting.

THE CEARA GAS COMPANY, LIMITED.—The annual meeting of the shareholders of this company was held in London on the 31st of October, A. A. Croll, Esq., in the chair. The secretary (Mr. Guyatt) read the notice calling the meeting. The directors report and balance-sheet were presented. The former stated that in consequence of the increased cost of coals and all other materials used by the company, the results of the year's working were not so favourable as heretofore. Considerable loss and great inconvenience had resulted from the delay of the Provincial Government in the payment of the amounts due for public lighting. Instead of having money on deposit at a high rate of interest as usual, the directors had been obliged to borrow money to pay for materials required, and this while a very large sum had been, and still was, owing to the company by the Government of the province. The directors were, however, hopeful that this state of things would soon be at an end, and that the operations of the company would ere long be as profitable as in former years. After paying the interim dividend in April, the balance available was £1403 15s. 2d., and the directors proposed to pay a dividend of 4 per cent. for the half year ending June 30, making 8 per cent. for the year, and to carry forward the balance of £203 15s. 2d. The chairman, in moving the adoption of the report, referred to the increased cost of coals, and all other materials used by the company, as having affected the profits. The delay by the Provincial Government in the payment of the amounts due for the supply of gas to the public lamps had also most injuriously affected the company during the period embraced in the accounts. He, however, hoped that the arrears would soon be paid, and that the increase in the rental and increased value of products would make up in a great measure for the increased cost of coal, &c. Dr. Fraser seconded the motion. In consequence of the delay by the Provincial Government at Ceará, the chairman stated that the directors were not able on this occasion to follow their usual course and pay the dividend on that day. He trusted that the amounts due by the Government would soon be received, and therefore he moved the following resolution, viz.:—"That a dividend of 4 per cent. for the six months ending June 30 be now declared, payable on receipt of the moneys now due by the Provincial Government of Ceará." The motion having been adopted, the retiring directors and auditor were re-elected, and the usual votes of thanks closed the proceedings.

Miscellaneous News.

GAS AND WATER WORKS FACILITIES ACT, 1870, AMENDMENT ACT, 1873.

WREXHAM GAS.

The Board of Trade have, upon the report of the commissioner who conducted the late inquiry at Wrexham, granted to the gas company there a Provisional Order, authorizing them to charge 4s. 8d. per 1000 cubic feet for gas supplied by them within a radius of one mile from the north porch of the parish church; 5s. 2d. for gas supplied beyond that distance, and within a radius of two miles; and 5s. 8d. for gas supplied beyond that distance. The order is to take effect on and from the 1st of December inst., and continue in force until the 30th of November, 1875. During its continuance the company are not to pay a dividend exceeding 3¾ per cent. per annum. All the costs, charges, and expenses incidental to the applying for, preparing, obtaining, and confirming the order are to be paid for by the company.

Board of Trade Inquiry at Cork.

(*Before* G. A. Vernon Harcourt, *Esq.*)

Court House, Cork.—Wednesday, Nov. 12, 1873.

Mr. P. O'Brien appeared for the Cork Gas Consumers Company, in support of their application for a Provisional Order to increase the price of gas; and Mr. J. M'Cartie, for the corporation, in opposition.

Mr. T. O'Connell also appeared, as he stated, on behalf of certain ratepayers.

Mr. O'Brien objected to the *locus standi* of Mr. O'Connell, as the clients for whom he appeared had filed no objections as required by the Act.

Mr. O'Connell admitted that his clients had given no notice of opposition.

The Commissioner: Do I understand you to have objections to urge other than those contained in the memorial of the corporation submitted to the Board of Trade, and sent by them to the company for their reply? Because I do not think any other objections should be entertained.

Mr. O'Connell believed he had other objections to urge, but when he had heard the case of the corporation it might become a question for him to consider whether it would be necessary for him to do so.

Mr. O'Brien referred the commissioner to the rules of the Board of Trade, which required that any objections intended to be urged to a Provisional Order must be sent to the office of the Board of Trade and a copy sent to the promoters. That had not been done by Mr. O'Connell's clients, whoever they were, and therefore he had no *locus standi* on the inquiry.

The Commissioner said that was his opinion, and for this reason: If the objections which Mr. O'Connell proposed to urge were the same as those urged on the part of the corporation, they would be sufficiently represented by the learned counsel who appeared for that body; and if his objections were different from those, they were precluded by the rule referred to.

Mr. O'Brien, in opening the case for the company, said at one time there were two companies in Cork, the United General Company and the Cork Gas Company, out of which the present company grew. The Cork Gas Company was established under the Joint-Stock Companies Act, 1856, and worked very well. After a time they purchased the plant, machinery, and business of the United General Gas Company. They had no Act of Parliament of their own, and could not interfere with the streets in any way without the assent of the corporation, who would not give them permission to open the streets unless they contracted to supply the public lamps at a very low figure indeed—£3 a year, he believed, including lighting and repairs. That would have left only 2s. 9d. per 1000 cubic feet of gas to the company, and it had to apply for an Act of Parliament. It appeared that in 1866 the corporation went to Parliament for an Act giving them liberty to sell gas, and in the bill which they brought forward they fixed a higher rate per 1000 than the company did in their bill. At length a conference took place between the company and the corporation, and the result of that conference was that the corporation in every respect adopted the clauses of the Act under which the Cork Gas Consumers Company was now incorporated. A committee of the corporation was formed to investigate the matter, and that committee reported to the corporation that the amount of the company's capital was rather small, having regard to the business of the company. The corporation now objected to the increase which had taken place in the capital of the company; but the latter were in a position to show that their capital was not so large as at the time of the application to Parliament they said was under the mark. As he had said, the company had worked remarkably well, and the proof of it was this: Up to the close of the year 1872 they divided amongst their shareholders 8 per cent., the maximum dividend allowed under the Act, and they did that though they did not charge the private consumers or the corporation the maximum price. On the contrary, they charged less than any town in Ireland, with the exception of Belfast, where there was comparatively a very large consumption of gas. That fact spoke trumpet-tongued for the efficiency of the management of the company. Then came, in 1873, the unprecedented rise in the price of coal; and on this ground—on account of the great increase in the cost of production—they sought to be allowed to charge an increased sum of 9d. per 1000 cubic feet of gas. The last dividend divided by the company was at the rate of 6 per cent. per annum, and that was chiefly made up of moneys taken from the reserve-fund, and partly from the profits; the amount taken from the profits, independent of the reserve-fund, being only at the rate of about ½ per cent.—showing clearly, in the first place, that the management up to 1872 had been excellent, and that the small dividend that had since been paid must be attributable to circumstances which lately arose—namely, to the marvellous increase in the price of coal. It would be shown by evidence beyond all impeachment that the price of Newcastle coal and Welsh coal, as delivered in Cork, was about 80 per cent. higher than it was when the company's Act of Parliament was passed, and he thought it would not be necessary to give any positive proof that by no human foresight could such an increase have been anticipated when the Act was passed. He would also refer to the great increase in the price of labour. Mr. Lane, the secretary of the company, who was in a position to prove it, estimated the price of common labour at 50 per cent. over what it was when the Act passed. The increase in the wages of stokers and firemen he estimated at nearly 30 per cent. In the observations which he made to the Board of Trade on the objections lodged by the corporation, he set it down at 50 per cent., but that was a mistake. It was only 30 per cent. He would explain to the commissioner how the mistake occurred. He estimated the increase in the cost of bricklayers labour at 10 per cent. and mechanics at 10 per cent., which was a marvellous increase in the cost of labour. There was also a very considerable increase in the cost of bricks, iron castings, and things of that description. Another increase was the increase as regarded rates and taxes. At the time this Act of Parliament was passed, in 1868, the rates and taxes payable by the company amounted to £600 per annum, and now they had increased to the sum of £2260, and he believed the most of that increase found its way into the pockets of the corporation. It might be supposed that, if these things could have been foreseen, the Legislature and the promoters of the Act would have made some provision for it; but by no human foresight could those things have been anticipated. The company rested their claim upon this great increase of the cost of production and of the burdens the company had to bear. It appeared that some objections of a rather vague and loose description had been made by the corporation. They alleged that there had been mismanagement, but he thought that allegation had been abundantly displaced by the fact that up to 1872, while the largest allowable dividend was paid, there was a certain reserve-fund put by, and the consumers were not charged the maximum price allowed by law. There had also been an allegation that there was a great deal of gas unaccounted for. The company were in a position to prove that when these works were originally constructed the engineer who constructed them anticipated that there would be about 20 per cent. of the gas manufactured unaccounted for, having regard to the circumstances of the locality, to which he would refer the court. Cork was a very curiously formed city; the elevation of some of its parts over others was very abnormal, and the gas had to be sent to some elevations 300 feet above the level of the gas-works, thereby necessitating very considerable pressure and consequent leakage. He believed there was also an allegation that the increase in the capital of the company had been too large. He did not know whether Mr. M'Cartie intended to go into that. The capital of the company was fixed by Act of Parliament, with the consent of the corporation which now made the objection, and the company had not employed the maximum figure assented to by the corporation at the time, nor did they take the maximum suggested by the Chairman of Committees, Lord Redesdale. Then there was another objection—that there was not a sufficient yield of gas per ton of coal. That objection arose from the fact that those who made the objection did not take into consideration the quality of the coal employed. The company employed Welsh coal, not Newcastle coal, and he should be in a position to give abundant ground for that preference. There were greater facilities for getting Welsh coal, and on the whole they found they could manufacture from Welsh coal, having regard to the facilities they had for obtaining it, a greater amount of gas in proportion to the amount used. He did not know that the corporation had made any other objection to the application of the gas company. It appeared to him, though his experience in these matters was not very great, to be as clear a case as ever came before a tribunal in support of an application for permission to charge a higher price for gas. It appeared that the corporation had petitioned Parliament to be allowed to erect competing works, and to purchase the business of the company. He did not like to throw out any insinuations against the corporation—they were all honourable men—but if they did do that it would be their interest to depreciate the business of the Cork Gas Consumers Company.

Mr. M'Cartie denied that they had done any such thing.

The following evidence was then given.

Mr. *Denny Lane*, examined by Mr. O'Brien.

I have been secretary to the gas company since the 1st of January, 1857. The United General Gas Compauy had been in existence since 1825. This company bought the plant, machinery, and business of the old company. Under a local Act any company contracting with the corporation had power to open the streets, and the corporation had power to contract with any company for three years, and they contracted with us. If we did not contract with the corporation we would have no power to open the streets and lay mains and services. In 1866 we went to Parliament for an Act. The corporation applied for an Act themselves in the same year to enable them to erect gas-works and compete with us. The charge they put in that bill was 5s. per 1000 within the borough, and 6s. outside.

Mr. M'Cartie objected to the reception of the witness's recollection of the provisions of the bill. It was for 14-candle gas the corporation were to charge 5s., and the present company proposed to charge 4s. 9d. for 12-candle gas.

The Commissioner said the more regular mode of proving this would be by the production of the document.

Examination continued: The corporation appointed a committee to meet the directors of the gas company, and the company presented a report to the corporation, of which I have a copy here. The amount of capital fixed by that Act was £150,000. The report of the committee adopted by the corporation states: "The directors satisfied your committee that the amount of capital proposed by the bill—namely, £150,000 to which they will always be restricted, is not more than Parliament usually allows to gas companies with the business of the Cork Company, but under the mark."

Mr. M'Cartie: We admit that the corporation did not think £150,000 too much capital.

Examination continued: The price of gas fixed by our Act was 4s. 9d. per 1000 feet, free of meter-rent, within the lighting district of the corporation, and 5s. 3d. beyond that. We seek now to put on 9d. additional. After getting our Act of Parliament the company worked very well. In proof of that allegation the company divided 8 per cent., the maximum under the Act up to the end of 1872. We did not charge the consumers the full price under the Act. We charged 4s. 6d. from January, 1869, until Midsummer, 1872, to private consumers. Our contract with the corporation for the public lamps at 3s. 9d. began on the 1st of January, 1870, and was for three years, so that it will expire at the termination of this year. During that time we divided the full dividend until the half year ending December, 1873. Our reserve-fund then amounted to £5750, and out of that there was taken, in order to pay 8 per cent. dividend, the small amount of £296. Our last dividend was 3 per cent. for the half year. That dividend amounted to £3620, which was made up of £3000 from the reserve-fund, and £620, balance of profits on the half year. So that practically we only paid ½ per cent. out of the profits, and the rest out of the reserve-fund. I ascribe the falling off in profits to the extraordinary advance in the prices of coal, labour, lime, iron, fire-bricks, and all materials employed in gas-making. In 1868, and for some time afterwards, Welsh coal delivered in Cork averaged 13s. 10d., and the present price is about 24s.—*i.e.*, an increase of not quite 80 per cent. Newcastle coal delivered in Cork at the company's stores at the time of the passing of the Act was 18s. 6d. per ton, and the same coal would now be 33s. That is also an increase of about 80 per cent. It was on those prices of 13s. and 18s. the terms of the Act of Parliament were based. We believed then that the Welsh coal was very unlikely to exceed 15s., and that the Newcastle was not likely to exceed 20s., and that opinion was based upon an experience of twelve or fourteen years at the time. Practically there had not been variation of 5 per cent.—certainly not 10 per cent.—for twelve or fifteen years before. I estimate the per centage increase of common labour at rather over 50 per cent., for this reason—the price of common labour at that time was 10s. per week; it is now 15s. per week; and besides that men then worked for 65 hours per week, or 10½ hours every day including Saturday, and at present they stop at two o'clock every Saturday. That makes the increase over 50 per cent. I estimated the increase of stokers and firemen at 50 per cent., but that was a mistake, because I went back a little farther than the date of the passing of the Act. The present rate of wages is 30 per cent. over that at the time of the passing of the Act.

The Commissioner: What was the actual amount paid at the time of the passing of the Act?

Witness: In 1867 and 1868 we paid for wages in the retort-house—scoopmen, 26s. 3d.; stokers, 24s.; wheelers, 16s.; and the present wages are—scoopmen, 32s. 8d.; stokers, 30s.; wheelers, 26s. 3d. At the former date the men worked seven days per week, at present they work only 6¾. The increase in the cost of mechanics labour comes to 10 per cent., chiefly arising from the number of hours, as they worked then 65 hours, and now only about 54. There is a very large increase in the price of fire-bricks and iron castings. The price of fire-bricks f.o.b. in Newcastle was 38s. to 42s. per 1000, now it is 65s. to 70s. The principal iron castings we use are mains, and they used to be from £5 5s. to £6, f.o.b. in Glasgow. The average price for the last year was £9 10s. to £10. They average now about £9. Retorts have varied in somewhat the same ratio as fire-bricks. Lime has increased from 1s. 2d. to 1s. 7d. per barrel. The discount off wrought-iron service-pipes was 65 to 67½ per cent.; at present it is

only 45 per cent., leaving the price to be paid by the purchaser 55 per cent. of the list price. That is an increase of 4-7ths. The discount at one time fell as low as 15 per cent. within the last two years. There is a change also in the price of meters, but it is not so large. The average amount of rates payable by the company was £615 a year for the five years previously to the passing of the Act. All those were local rates, except income-tax. Last year we paid £2267 rates. The yield of gas per ton of coal in 1872 was 8425 cubic feet at the station-meter, and in 1873, 8778 cubic feet. In the first of these two years we used partly Welsh and partly Wigan coal, and the increase in the second year arose from having used a proportion of Newcastle coal. The reason why we used the Welsh coal for the smaller yield of gas was because the price was so very much lower than Newcastle coal. With the quality of gas we had to give—14 candles—we could not take out of the coal all the gas that was in it, as by taking a greater quantity of gas we should have to take an inferior quality; and I consider that that yield for the coal used, and the illuminating power of the gas, instead of being small is a large yield of gas. If we had used Newcastle coal during those years I believe there would have been a loss of some thousands a year to the company.

Mr. O'Brien: What do you say with reference to the unaccounted-for gas?

Witness: I have in my hand the original estimate of Mr. Anderson, who designed the works, and he estimated at that time that there would remain of the gas made only 80 per cent. for sale, and that with perfectly new mains and services. That estimate was made in 1857. I should say that what is represented in our returns as "unaccounted-for gas" includes a quantity burned on the works, being about 1 per cent. on the whole quantity made. The principal cause of this gas being unaccounted for is the great extent of mains in proportion to the rental. The longer the main and the less the consumption the greater the per centage of waste on the quantity consumed will be.

The Commissioner: Do I understand you to say that the district is an unusually scattered district?

Witness: Yes. The rental is only about £600 per mile of main, and I understand that in some cities there are miles of main with over £3000 per mile rental upon them. The consumption of gas by day is very small in Cork, the amount consumed by each consumer is very small, and consequently a very small quantity of gas being registered upon each service, there is a possibility of leakage upon each service. Another cause is that some parts of the city are much higher than others. We send a large quantity of gas to the Military Barracks, which are 300 feet above the Ordnance datum, and the works are only a few feet above the Ordnance datum. Sunday's Well, Blarney Lane, and some portion of the southern district are also at a very great elevation; and at Blackrock, a district sparsely peopled by gas consumers, there are no public lamps, and therefore there is an increased per centage of leakage. If we had a larger consumption the per centage of leakage would be less, although the actual quantity would be more.

Mr. O'Brien: With reference to the increase in the capital of the company, having regard to the income of the company, I believe the employed capital is not too large.

Witness: At Midsummer, 1872, the total capital of the company was £124,261 in shares, and £12,000 balance of debentures. By balance of debentures I mean a certain number of debentures on which we paid interest, which number was in excess of the number of certain other debentures on which we received interest. The whole of our employed capital was therefore £136,000. The whole amount of capital limited by the Act was £157,000 in shares, and £37,000 in debentures. Our capital was therefore less than 3¼ times our income, which I consider a very moderate capital.

Mr. O'Brien: There is an allegation about your issuing some new shares at par.

Witness: When the company was originally constituted under the Limited Liability Act, the company was required by law, whenever the shares were at a premium, to offer new shares to the existing shareholders; and when we obtained our Act of Parliament in 1868, that Act incorporated the Companies Clauses Act, and the Companies Clauses Act provides, by the 58th section, that at the time of any augmentation of capital by the increase of new shares, if the existing shares be at premium, the directors are bound to offer them to the existing shareholders *pro ratâ*.

Mr. O'Brien: No, with reference to the new works that have been made at your establishment here?

Witness: The largest extensions we have made are in retort-houses, coal stores, washers and scrubbers, purifiers, apparatus for the manufacture of sulphate of ammonia, larger connexions that enable us to use this new apparatus in the works, and also considerable extension in the city, larger mains being substituted for smaller ones, and in other cases there are new mains to enable us to distribute the gas at a high initial pressure at the works. I believe these works were justified by the increased consumption of gas in the city and the corresponding income. As to our large gasholder, the usual rule is that the actual gasholding capacity should be equal to the heaviest day's consumption in the year; but when you are making a gasholder you must also make some provision in advance for future increase of consumption. The total contents of our gasholder at present is 1 million cubic feet, and our heaviest day's consumption last year was, I think, 847,000 cubic feet. So that practically we have only 150,000 feet of gasholder capacity more than the heaviest consumption last year. The consumption has been from year to year increasing. Therefore past experience justifies the anticipation that some one day's consumption will in future fill the present gasholder, and I hope before very long. In Newcastle, the price per 1000 cubic feet fixed by Act of Parliament is 5s. 4d., and that is in immediate proximity to the collieries. The difference between the price of coal here and there is about 8s. per ton. We made two additional retort-houses—one of them is only just finished—and I believe they are essentially necessary to the business. We erected very large dry lime purifiers, and I believe they will lead to a considerable economy both in gas, lime, and labour, as the previous purifiers were too small. We erected also a very large washer and scrubber to remove the traces of ammonia from the gas, and to manufacture sulphate of ammonia. All these will pay a good interest on the sum invested in them by the saving and profit they will make. We have at present, although not yet at the busiest season, every retort in use except the new ones, which we are about to put into use at once. We shall then have no reserve retorts to go to in case of accident. Our business is a yearly increasing business, not increasing as fast in Cork as in other places, but still increasing, and we supply consumers at a smaller figure than in any city in Ireland except Belfast, where there is a very condensed population, and a large amount of consumption by reason of its extensive manufactures.

Cross-examined by Mr. M'Cartie: Lord Redesdale proposed to give us £200,000 nominal capital, but he did not consent to the actual amount of capital we issued. He left that power in the hands of the company. During the time we were paying 8 per cent. we had a depreciation-fund. In June, 1868, that fund amounted to £5001; there has been nothing added since. The greater part of that amount has been written off. It is depreciation, and the insurance-fund was taken as the nucleus of a reserve-fund. This £5000 was part of our undivided balance, and was invested in the works. I do not believe that by the Act it was intended that the depreciation-fund should be an actual *bonâ fide* sum of money set apart and invested in some security. We keep up an insurance-fund still, though it is a small one. We transferred £2000 from the insurance-fund to the reserve-fund when the company ceased to be their own insurers, deeming it better to insure their works, &c., otherwise, and they have insured the works to perhaps three-fourths the value of the buildings. The necessity for a depreciation-fund with a gas company depends upon the extent to which their works have been maintained. I maintain our works are worth more than is set out on the balance-sheet, and therefore there is no depreciation. The works have improved. I think the cost of materials and everything has so increased that the works are now worth considerably more than was represented on the balance-sheet. The old company's works were very much inferior to what we have made them. We got them for £27,000 when they were really worth £56,000. That is one very important reason why we do not require a depreciation-fund—because we got the works cheap. We have maintained the works out of income, not out of additional capital; and because that has been done, no depreciation-fund is necessary. All our plant is in excellent order, with the exception of a few retorts of the old company. Our leakage is greater than in some companies, but less than in others. Our paid-up capital in 1858 was £39,000; at the close of 1859, when we bought the United General Company, it was £84,000, which included paid-up capital, share capital, mortgages, debentures, and all together. When we got our Act of Parliament in 1868 our capital was £118,000; next year it was £122,000; next year £125,000. In 1871 we invested a considerable amount in railway debentures, and had £119,000 paid up; and at the close of 1872 our capital was £126,000. In Midsummer, 1873, in consequence of those large purifiers and other apparatus we put up lately, the capital came up to £136,000. Our capital in 1860, the year after we got up the business of the old company, was £819 per million of gas made. At the close of 1872 it was only £749 per million of gas made. The consumption of gas in Cork has increased since 1860 about 68 per cent. This is not a very large increase; but the increase in the cost of labour and materials is very large. We have voluntarily reduced the price of gas twice—first from 4s. 6d. to 4s. 3d., and then to 4s. 1d., the illuminating power being then about 10 candles. I am of opinion that in Cork gas of a more superior quality is made with a mixture of Welsh and cannel coal than with Newcastle coal, because of the difference between the Welsh and Newcastle freights, which is about 5s. or 6s. The difference of yield per ton is about 1000 feet—certainly not more. If the gas-works were my own, to be worked for my own profit, I would use Welsh in preference to Newcastle coal. The Dublin Company used a large quantity of Welsh before. They have come to grief principally since they have been using cannel coal.

Mr. M'Cartie: I believe you were not satisfied with the Welsh and Wigan, but have tried other expedients?

Witness: We used a quantity of tar under a patent taken out by me and other officers of the company. The company gave me £1000 for that patent. It had been tested by the company's resident engineer, Mr. Still, my co-patentee. Mr. Anderson, our consulting engineer, did not test it. I cannot say that it is fully approved of. They paid the thousand pounds before any one tested it but the gentleman who was to get half the proceeds. I believe the company made a large saving by the adoption of that patent. They did not pay the money till they saw the results themselves. The patent was tried in Dublin, when they made 16-candle gas; they paid us a royalty for the use of the patent, and found it a great economy; they used it until they required an illuminating power of 20 candles, and the patent was never intended to be applicable to the production of that power. The effect has not been to foul the mains. I believe there are no mains so free from naphthaline as those in Cork. No town in Ireland could be fairly compared with Cork as regards the manufacture and sale of gas. The leakage with us this year is under 22 per cent. of the gas made. I do not think there is any understood per centage of leakage as a general rule. Fifteen per cent. might be the average in a thickly populated district.

Mr. M'Cartie: What steps have you taken during the last four or five years to reduce the leakage?

Witness: We have enlarged the mains so as to reduce the initial pressure from the works, and the services have been tested, particularly of late, as we found some leakage. We do not find any increase in the leakage. At the time of the passing of the Act the unaccounted-for gas in that year amounted to nearly 21 per cent. It was not principally by the reason of the use of tar that the purifiers became necessary.

Re-examined by Mr. O'Brien: There is nothing compulsory in the Act to oblige us to have a depreciation-fund. The corporation had power to appoint an auditor to examine our accounts, and they did not do so. Only on one occasion did the corporation officer, who tests the gas twice a day, report that it was barely up to the standard. On every other occasion he reported it equal to the standard.

Mr. *George Anderson*, examined by Mr. O'Brien.

I am the consulting engineer to this company, and my first connexion with Cork was at the time when these works were about to be established. An offer had been made to the United General Company by the corporation, which was refused, and then the citizens threatened to form a company of their own. I was called to Cork by the corporation, and I advised them that instead of erecting new works they should offer the old company a fair price for their undertaking. This offer being refused, the Cork Consumers Company were established, and ultimately they bought the works of the United General Company for about £27,000. I believe it was a very good bargain, as they cost the latter company £56,000. My estimate for building new works was £40,000. I was connected with their erection in 1857, and have been connected with them ever since. They were most efficiently and very cheaply built. I made an estimate of what I thought the loss for unaccounted-for gas would be at that time; I estimated it at 20 per cent. The reason I did so was this—Cork is a very large city in area, with a very small consumption of gas for that area. It necessarily requires a very large quantity of pipeage, which is the cardinal consideration with a gas company, inasmuch as leakage depends on the length of mains. I considered the mains were of such a great length here in proportion to the business to be done, the leakage would be greater than in a close compact district—for instance a manufacturing district—where the consumption would be heavy—£2000 a mile as against £500 or £600 a mile. My estimate of the leakage was proved to be correct. The Cork district is 54½ miles long, and the area is 60 miles. We have very high grounds on both sides of the river, and we have to carry our mains up that high ground. An additional pressure of gas is required for that, for while the smallest pressure—5-10ths or 6-10ths—will be sufficient over the low ground, it requires as much as 30-10ths for the higher portions. We have modified that by governing the mains, but it is impossible to modify it so much as if you had the mains on a level district. The greater the distance the mains have to be sent, the greater the probability of leakage. The leakage having increased for the last two or three years, has not been so much in consequence of defects in the company's apparatus as from altered circumstances. The corporation, I believe, very justly economize the gas in the public lamps as much as possible, They put out the gas when the moon shines, and in Ireland that is uncertain. I would suggest to the corporation that when they put out the lamps they should give the gas company notice of it, so that they may regulate their pressure accordingly, for the pressure is kept on the mains at night, when the lamps are not lighted, as the company do not know when they are put out, and therefore the leakage increases. I say most decidedly and distinctly that the present leakage is no reflection on the management of the company. The directors have taken a lively interest in the economical working of the company. It is their interest to have the leakage as little as possible, and they have exercised all care in trying to do so. From time to time we have tested the mains in the high districts, because we knew that our greatest losses from leakage occur there. By that means we have been able to stop the leakage. I consider the management of the company is and always has been, most efficient. I do not know of any place with which I am connected where the mains are more closely looked

after, and where there is such an intelligent staff, and where statistical matters are so well attended to. The capital of the company has been always small from its inception. The works were built some thousands of pounds under the original estimates. The directors of the company are all men of business, and form a most excellent board. They have never expended money on the works except for purposes of utility. The new works are in advance of present requirements, but some of them we are bringing into action now. I know the price of the materials used in gas manufacture, and I confirm all that Mr. Lane has said on the subject entirely. I think it would require an increase of 9d. per 1000 in the price of gas to enable the company to pay a 5 per cent. dividend. The "depreciation-fund" of a gas company is not a sum of money invested in securities, but an amount, stated in account, which is periodically written off, and applied throughout the year in the repair of service-pipes, meters, &c. I agree with Mr. Lane as to the yield of gas in Cork, and I may state a fact which, perhaps, is not generally known, and that is, that you cannot extract so much gas from coal (even Newcastle) in Ireland as you can in England. One reason is the great humidity of Ireland. There is scarcely ever a cargo of coal landed in the Cork works the whole of which, or a large portion of which, is not highly saturated with water, for the rainfall in Cork is double what it is in most parts of England. We have to cart our coals from the ship's side to the works, a distance of nearly a mile, with very often a downpour of rain the whole time. I have works of my own in England, as well as in Scotland, in as precisely similar circumstances as works in different localities can be, and I find that while in England at two gas-works I make 9573 feet and 9564 feet of gas per ton of coal, in Ireland I make only 9285 feet and 9300 feet per ton of 12-candle gas. But in Cork we have to make 14-candle gas, so that the 9200 feet should be reduced to 9000 feet. It would be injudicious to take more than 9000 feet of gas out of a ton of Newcastle coal in Cork. I do not think it better altogether to use Welsh instead of Newcastle coal, for Newcastle coal produces better coke, and it would be well, therefore, to have some better coal mixed with the Welsh. In the Cork Gas-Works, unfortunately, we have no sale for breeze at all, whereas in England brickmakers purchase it. Here we have to do the best we can, and burn it with tar. The Welsh coal yields more friable coke than any other coal, and when that coke is exposed to the air it becomes breeze, just like the sand that is washed from stones in the ocean.

Cross-examined by Mr. M'CARTIE: The company, I think, has been well managed in every way, and it has done its best to work economically for the advantage of the shareholders and the public generally. It has been a thorn in the side of many gas companies in Ireland, because of the low price at which it sold gas. I cannot compare Cork with Belfast as the latter is a manufacturing town. Limerick is the only city I know which comes near Cork as regards gas supply. There is nothing wrong in the leakage of this company beyond what is wrong in many companies in the same respect. We always try to reduce the leakage as much as possible. When I find the leakage increase even by 1 per cent., I immediately take steps to remedy it. Since the inception of the company we have been always taking steps to stop leakage.

Witness was then cross-examined as to whether he knew where the stop-cocks were placed to govern the pressure of the gas on the rises of the ground. He said he ordered them to be put in different places, but he could not tell the actual spots, as he did not dig the holes and put the meters in. He ordered them to be put there, and he believed they were put down. I am lessee of the Waterford Gas-Works. Within the last six months I have obtained from the company there an increased price for my gas, in consequence of the advance in the price of coal. I was not consulted by the Cork Gas Company about the adoption of the patent process of Messrs. Still and Lane, and I have not tested that process, but I have used similar plans for the last 20 years. I shall test this process next spring, and Mr. Lane is so confident of its efficiency that he has offered to return the money to the company if it is not successful.

Mr. M'CARTIE: Are you aware that the old company offered to supply gas at 2s. 6d. per 1000?

Witness: I know they did. They did it to crush us, but I immediately wrote a letter to the papers showing the citizens of Cork what fools they would be if they took gas from those gentlemen at 2s. 6d., who not two years before came down from their price of 7s. Instead of crushing us the people laughed at them; and to show you the result of it, when we built our works they were only intended for 900 consumers, but we obtained 1500 consumers, and had to extend our works.

Mr. *Lane* was recalled, and, in answer to Mr. O'BRIEN, said there were check cocks governing the mains put at the foot of several hills to check the pressure. They were governors, but not self-acting governors. Some were put at the bottom, and some half way up the hill.

To Mr. M'CARTIE: He believed they were examined since they were put down, but he did not remember any report had been given to the company in reference to them.

Mr. *Anderson* said they had five governors at the works to check the pressure, but in addition to that they found it necessary to put checks on the high level.

Mr. *Lane* said that some time ago the company tried to get self-acting governors, but they could not get any that an engineer in whom they had confidence could recommend strongly.

This closed the case for the company.

Mr. M'CARTIE said he would first deal with the case made by the claimants, and secondly lay before them the answer the corporation had to give, and he believed there would not have been any necessity for the present inquiry had there been a little candour shown on the part of that company, who for some reason or technical objection refused the officers of the corporation access to their books. The corporation were refused that liberty, and hence arose the necessity for that being done in public which could be more conveniently, and perhaps more effectually, done in private. First, as regarded the original formation of the company, he had little to do with that except merely to say that an old company was in existence who manufactured gas of excellent quality and charged a high price for it. In the end, however, it did not cost more than the gas of the present day. A new company was started by Mr. Maguire, an exceedingly talented and popular gentleman, and leading member for the city of Cork. That gentleman took the matter under his protection, popular fervour was got up—there was more moonshine in this country than in England—and, at all events, Home Rule carried the day. The new company was established, and every one came forward as its supporter. The allegation was that that company had been admirably managed. He (Mr. M'Cartie) would leave it to the commissioner if any company of the kind should be started without a depreciation-fund. By a depreciation-fund he did not mean that which was at one time called a reserve-fund and at another a depreciation-fund, which could be written off from one account to another—that was not what the Act of Parliament meant. They should not be placed on the books of a company which had no existence. But the true meaning of a depreciation-fund was that a certain sum or portion of the company's earnings was laid by to repair injuries and losses, and in that way guard against the effects of time and accident. All the principal companies of the city provided for such a fund by a certain per centage on their actual earnings, and it was ridiculous to say that a fund of this kind was not actually necessary, but no matter how often repairs were made, depreciation would still go on. Then there was the question of the purchase of this patent, which came out in evidence. Was the action of the company with regard to this patent that of a well-regulated company? Supposing the patent were the best that ever sprang from the mind of man, that did not absolve the company. They had a very clever engineer, thoroughly up in everything connected with his profession, but without getting a report from him they put their hands in the pockets of the company and paid £1000 for what may not be worth the price of the patent. That, in his (Mr. M'Cartie's) opinion, was not evidence of a well-regulated company. Now, as to the very important matter of leakage. Mr. Lane, the secretary, and Mr. Anderson, the engineer, were both examined, and neither of them could give the proper information on this most vital point, whether the company had taken the precaution of stopping the amount of leakage, which, if reduced to the minimum, would pay a dividend of 5 per cent. He (Mr. M'Cartie) thought that he would be able to show by figures that if the leakage was reduced to 10 per cent. the gain on that alone would make within a fraction of what was taken to be a reasonable dividend by Act of Parliament. If the commissioner was of opinion that the company had it in their power to take the proper precautions to prevent this waste by leakage, and did not do so, he should come to the conclusion that they made no case, or, if they did that, it would not entitle them to such an amount as 9d., but to a great deal more moderate one. It fell from Mr. Anderson that 9d. would not pay 5 per cent., but he (Mr. M'Cartie) was instructed that it would do a great deal more. He would ask, was it good management in a vital particular when Mr. Anderson could not tell them anything whatever about those governors, except that he gave instructions 20 years ago about them, and never made any inquiries to see if those instructions were carried out? Mr. Lane knew very little about them either. He (Mr. M'Cartie) was instructed that those governors were totally distinct from the stop-cocks, whereas if governors were put at certain altitudes, it would stop the waste of gas altogether. The real point the commissioner would have to look to was this, in order to give his opinion. No one would question the fact that the price of coal was great, but the answer to that was, that though it was true the price of coal had increased, still the company had no right to ask the public to make good their dividend of 8 per cent. until they satisfied the court that they had made every reasonable exertion to prevent losses which were not necessary losses. They had in evidence that there was a leakage of 22 per cent., and they had no evidence that any proper steps had been taken originally to prevent that waste, and Mr. Lane stated that there was never any report what was the effect of any examination upon those stop-cocks. They went asleep upon the matter, and let the leakage increase until in one year it took a jump of about a million and a half, and then it became necessary to take some steps. It was then for the commissioner to consider whether the fact that the company had not taken the proper precautions to reduce the leakage was not an answer to the case made. Now, the only high points of the city were Sunday's Well and Montenotte; the rest of the leakage might be prevented by governors. Take the rest of it, and there was not a more compact city anywhere. In point of fact, it was so compact as to become a nuisance. Cork was the only city where there was no such thing as a garden—there was no room for it. It was with difficulty room could be got for a stable. Glanmire and the Dyke were the only lonely services in the city, but in the fist of the city the houses were packed as closely as possible. The only other point of importance was the mode of the manufacture of gas. If he thought this mode was not the most efficient, or that a better course might be adopted, he would see that the company had no power to increase their dividend. If they wished to make experiments they had a right to pay for it. The question for the commissioner was this—whether, apart from the mismanagement of the company, there had been such a rise in the price of coals and other materials as to warrant such an increase. He should remark that it was very extraordinary that during the course of the inquiry the man who ought to know most about it—Mr. Still, the engineer—had not been produced. If any one could throw light on the matter it was surely he, yet he had not been produced.

Mr. O'BRIEN: We can have him if you like.

Mr. *G. W. Stevenson*, examined by Mr. M'CARTIE.

I am an engineer, residing at 19, Great George Street, Westminster. I have been practising on my own account for nearly 30 years. I have great practical experience of gas companies. My whole life has been devoted to it. I advise a good many companies at present, and have leases of gas-works at Oporto and in South Wales. To my mind it is not an insuperable difficulty to distribute gas to a height of 350 feet. I went down in 1856 to Halifax as engineer to the corporation in connexion with the gas-works, and found a leakage of nearly 30 per cent., and there was a difference in the levels of nearly 600 feet. I then took the question of leakage in hand. I put down governors at altitudes of every 50 feet, so that no part of the town had more than 2 inches nor less than 1 inch of pressure, and in 12 months the leakage was reduced from 30 per cent. to less than 10 per cent. There are 70 miles of mains, and varying altitudes of 600 feet. The gas-rental per mile is less than £500, and the unaccounted-for gas is now under 9 per cent.

The COMMISSIONER: What was the price of gas then?

Witness: Four shillings within the borough and 5s. without the borough.

Examination continued: Again, as to Oporto, we had there only a seven years lease, and therefore did not do much to reduce the leakage, but we found the leakage 40 per cent., and reduced it by districting and otherwise (and not at all by such a system as if we had the works in perpetuity) to 23 per cent. I could reduce the leakage anywhere. I do not care where it is, except in a mining district. It is the thing more than any other that is in the control of the engineer in charge, and there is no excuse for excessive leakage. I should like nothing better than to take in hand the leakage of this company, and to be paid by results. The system of check-cocks used in Cork as described is quite useless. One valve placed on a hill-side would keep down the pressure uphill during the time of consumption, but would allow it to accumulate during the 18 hours when there is comparatively no consumption, and the pressure of gas accumulates 1 inch to every 100 feet of altitude. No efforts have been made by the gas company to prevent this, but if taken in hand it could be prevented. The leakage absolutely in Cork is 21½ per cent. If it were reduced to 10 per cent. it would save the company £4000 a year at the cost price of the gas, or it would save them the purchase of 2000 tons of coal, or it would give them 3½ per cent. on their dividends. I have not the slightest doubt the leakage could be reduced to 10 or 12½ per cent. Seven-eighths of the gas is consumed in the flat of the city, and it is only residences and large public establishments on the hill-side that are supplied by small mains. The flat of the city is very closely built and not scattered. I was never in Cork until Monday afternoon, but I spent a considerable time in examining it, and I consider it a very closely built city. The share capital of this company is £124,261 paid up, and £17,950 on debentures, making a total of £142,219. The quantity of gas sold is 133 million feet in the year, and the capital employed is equal to 21·39s. per 1000, as against 19s. 2d., the highest in London, 16s. 5d. being the average of the London companies, and 10s. 2d. the lowest. The amount of capital here, in proportion to the business, is higher than that of any company in London. The capital is very large, not so large as in some places, but more than it ought to be. It is well known and understood amongst gas engineers that if the capital of a company exceeds 16s. per 1000 feet of gas sold, which is £800 per million feet, the price required to pay a proper dividend is too high—too high consistent with public policy. Then either of two things must happen, either the company should be satisfied with a smaller dividend, or permission should be given to another company to set up works with a smaller capital. As compared with gas-rental, excluding residuals, capital should not exceed one-fourth. The amount received for residuals is frequently a large proportion of the income of a gas company. The residuals for the past half year were £5500

out of £20,000—more than one-fourth of the whole. It varies much in different places. The capital is here large—it is larger than the average. It is manifest that the larger the business any one can do with the amount of capital the more remunerative that business must be, and where a gas company has a larger business employed than ordinary, they are compelled to charge a higher price for gas.

The COMMISSIONER: That estimate would be affected by the price of coal?

Witness: Not specially. Of course everything else enters into the price of gas. Having got the cost price of gas at the consumers meters, there is then to be added so much per 1000 feet to pay a dividend. If the capital is large, the sum to be added to the cost price of gas is larger than if the capital is small.

To Mr. M'CARTIE: The capital in Belfast is £200,000 for 400 million feet sold; here it is £142,000 for a consumption of 133 millions. Those companies are sure to come first to take the benefit of this Act who have the largest capital. The Cork Company ask for an increase of 9d. per 1000 feet. Ninepence on the quantity of gas sold will be nine times £555 (1d. gives £555), or say £5000. They want £6213 to pay 5 per cent. I have made a calculation which is as follows:—The gas sold for the year ending June 30, 1873, was 133 million feet. The unaccounted-for gas need not exceed 10 per cent., but say 12½ per cent., and the required make will be 152 million feet. Then, if Newcastle coals were employed, 15,833 tons would be required to make 152 millions. But, in order to ensure a minimum of 14 sperm candles being maintained through the district, I would use 6 per cent. of cannel, or 14,883 tons of coal with 950 tons of cannel, making 15,833 tons altogether. As regards the coke, I would assume there would be no saleable coke from the cannel, and no breeze from the Newcastle coal. I set one off against the other. Then 14,833 tons of coal will produce 14,833 chaldrons of coke, and after allowing 20 per cent., or 2977 chaldrons for fuel, there will remain 11,906 chaldrons for sale. Then there is the estimated cost of gas on that data. I assume that for the year ending June 30, 1874, there will be no increase in the business beyond that of the year previous. I come to the cost of manufacturing the gas, taking the coal at 33s. per ton, which is £24,577, and the cannel at 58s. per ton, £2517, together £27,074, or 48·85d. per 1000 feet. Then I deduct residual products. The coke I take at 20s. per chaldron, and that would be £11,906; 158,330 gallons of tar at 3d., £1992; ammoniacal liquor, say £200; leaving the cost of the residuals at £13,098, and that would leave the net cost of coal at £13,176, or 23·78d. per ton.

The COMMISSIONER: Can 3d. per gallon be got for tar here?

Witness: They have made that return to the Board of Trade inquiries.

Mr. *Lane:* We had not 10 per cent. of tar for sale; we burn it in the furnaces.

Witness: I heard at the works about 25 per cent. In London the contracts for tar are 2¾d. or 3d. per gallon.

Mr. Lane: But we have no tar distillery here, and we cannot sell it.

Witness: It is shipped there.

Mr. *Lane:* We never got a higher offer than 1½d.

Examination continued: I take the purifying materials, labour, wear and tear, salaries, rent and taxes, auditors, directors, and general charges as per last half year's account, and I double it for the year, and it amounts to £12,256, or 22·17d. per 1000. The interest, insurance, bad debts, &c., I put down at £997, or 1·75d. per 1000, and the cost of the gas is then £26,429, or 47·70d. per 1000 feet. The net cost of gas at the consumers meters is thus shown to be 3s. 11¾d. per 1000 feet; and the maximum price in the company's Act of 1868 being 4s. 9d., it follows that 9¼d. per 1000 feet is available for dividend, which upon 133 million feet sold is equal to £5154, or 4·14 per cent. on the share capital. Five per cent. on the share capital is £6213, and is. profit per 1000 feet on the gas sold (133 million feet) will produce £6650, so that if the maximum price be raised from 4s. 9d. to 5s., it will under proper management more than suffice to secure to the company 5 per cent. on the share capital. I do not agree in the propriety of using Welsh coal. I believe a saving would be effected by using Newcastle coal, and I hope the commissioner will go to the works and see what is going on there. Every available place is filled with breeze, for when Welsh coke is exposed to the weather it falls into breeze, and becomes useless, but Newcastle coal coke will not get into that condition. I have not to any great extent tried the tar process. I used it, but did not find it answer. The company should get the best coal for gas and coke, because they have to pay a large freight in any case. Newcastle coal is mostly used. In Oporto I get 9700 feet of 13-candle gas on the year's working. As regards the works in Cork, I do not think they are well managed at all, but they have spent money needlessly in building. The works are badly arranged. They have three different retort-houses, gasholders in one part of the yard and gasholders in another. But that is caused by their having bought the works of the old company, and Mr. Anderson would certainly not build them as they are if he started with a clear field. Mr. Anderson admits the company have a surplus unproductive plant at the present moment of between 30 and 40 per cent.; that is, they have that amount of plant more than is required, and it is a question whether the consumers of the present ought to pay dividend on plant and machinery erected for the wants of future customers.

Cross-examined by Mr. O'BRIEN: I was engaged for the corporation in 1868; that was the only occasion besides this. In Halifax the leakage is now under 9 per cent.; in 1866 I left it under 10 per cent. It was over 29 per cent. when I went there in 1856. The make of gas there is about the same in quantity as it is here. In Oporto the leakage is still 23 per cent.; but if I had the fee simple of the works I would soon bring it down. In Oporto we are making less gas than seven years ago, but are selling much more. My system here would be to introduce street governors on the leading lines of main, and reduce the pressure at altitudes of 50 feet. It would not answer any good purpose to cut the mains or increase their size, for the pressure would accumulate during the daytime whether you have large or small mains. If you have large mains you would be enabled to work with lower pressures than with small mains. It would not be advisable to put in check cocks. I believe the leakage here could be reduced to 10 per cent.

Mr. O'BRIEN: Now, now!

Witness: I will undertake to do it on the principle of "no cure no pay." I am aware that when Mr. Anderson made his original estimate he anticipated 20 per cent. leakage; but leakage used be very much greater throughout England then than it is now, and I think Mr. Anderson, looking at the fact that the average leakage of gas companies was 16 per cent., was at the time very wise in estimating that the leakage here would be 20 per cent.; but we know a great deal more about that matter now than then. I disagree with Mr. Anderson that 20 per cent. is an average leakage now.

Mr. O'BRIEN: You know what the leakage in Dublin is? You know it is 31 per cent.?

Witness: I should be afraid to say what it is. Very likely. The company are in a state of bankruptcy. Mr. Anderson is a very successful man, and deserves the success he has attained. I would consider the capital too great if it were six times the gas-rental—if it exceeded four times. The gas sold is 133 million feet, and with a 10 per cent. leakage it would require 148 million feet to be produced. The per centage is taken on the make, not the sale. That is 15 million feet unaccounted for. There is now a loss of 36 million feet, and the difference between that and 15 million feet being 21 million, would be more than £4000 a year. I calculate 3d. increase on the charge would enable them to realize 5 per cent under proper management. I have taken into consideration the depreciation-fund. It is all bunkum. You are not bound to set aside a depreciation-fund. I do not say that a reserve-fund is bunkum. You would be perfectly right to put by a reserve-fund if you have a surplus to make it. I do not remember a committee of the House of Commons being taken aback at my saying that leakage could be reduced to 10 per cent. I could mention numbers of companies who have reduced their leakage to 10 per cent. The Cork works are not extravagantly constructed, but the arrangement is not good, and I am sure if Mr. Anderson had designed them as a whole at first he would not have arranged the works in such a way.

In reply to Mr. M'CARTIE, the *witness* said that he knew of companies in London who had reduced the per centage of leakage to much less than 10 per cent. The average per centage of leakage throughout London was 14 or 15 per cent. The traffic in London was very heavy, and it interfered with the mains very much. He should imagine that the leakage should be greater in London than anywhere else, except in a mining district.

To Mr. O'BRIEN: The leakage averages 15 per cent. in London, but the consumption is very great as compared with Cork.

In reply to the COMMISSIONER, Mr. *Lane* said he was not prepared to say what proportion of the gas was supplied to the high-lying districts, but he thought it was about 1-6th of the whole. He did not know of any means by which it might be ascertained. There was another matter, he said, which operated against them. The early closing movement had been adopted in Cork, and consequently a large number of the business houses were closed at six o'clock. If a person walked through London he would see the great amount of business done and the immense quantity of gas consumed to a late hour; but, with the exception of hotels and public-houses, there were no houses in Cork open after six o'clock. That made the per centage of the leakage higher. The company had about 52 miles of mains.

Mr. *Anderson*, in explanation, said that it was totally impossible in a city like Cork to reduce the per centage of the loss of gas to 10 per cent. As to the quantity of feet to be taken out of a ton of coal, it was said that 9600 could be got out of it. He could take that amount out of a ton of coal, but he knew it would not be profitable to do so if he was to make 14-candle gas. He could not get more than 9000 feet of gas out of a ton of coal here and to make 14-candle gas. As to the leakage, he had a leakage of 20 per cent. in Waterford, and it was found difficult to reduce it. He was sorry he had to contradict Mr. Stevenson, but he should say it was physically impossible for him to do what he said.

This closed the case for the corporation.

Mr. O'BRIEN replied on the whole case on the part of the company.

The COMMISSIONER said he thought the case had now been fully brought before him. He had only to thank the counsel on both sides, and the town-clerk, for the assistance they had given him, and as soon as he could he would make his report to the Board of Trade.

Mr. M'CARTIE, on the part of the corporation, and Mr. O'BRIEN, on the part of the company, thanked the commissioner for the courteous manner in which he had conducted the inquiry.

The COMMISSIONER intimated his intention of visiting the works before his departure.

The inquiry then closed.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

The Half-Yearly Ordinary Meeting of Shareholders was held at the Terminus Hotel, Cannon Street, London, on Tuesday, Nov. 25—P. TWELLS, Esq., in the chair.

The SECRETARY (Mr. A. F. Jackson) read the notice convening the meeting, the corporate seal was affixed to the register of shareholders, and the following report was submitted:—

The present half-yearly ordinary meeting of the shareholders has been convened agreeably to the company's Act of Parliament for the purpose of receiving a report from the president and directors upon the affairs of the association, and for declaring a dividend for the half year ended the 30th of June last.

Gas Made.—The total quantity of gas made at all the stations in the half year ended June 30, 1873, was 2,490,511,180 cubic feet; the total quantity made in the corresponding half year of 1872, was 2,326,655,380, being an increase of 163,855,800, or at the rate of 7·04 per cent. increase. The increase of the same period of 1872 over that of 1871 was 10·30 per cent.

Lights.—The total number of lights at all the station on June 30, 1873, was 972,301; the total number of lights on June 30, 1872, was 955,482. These figures show an addition of 16,823, or of 1·76 per cent. This small increase in the number of lights is accounted for by the fact of the works and mains at Cologne having been, as was stated to the shareholders at their last meeting, in May, transferred on the 30th of April to the town authorities.

Mains.—The total length of mains laid up to June 30, 1873, was about 1177 miles, being an increase of more than 37 miles on the corresponding half year of 1872.

There is nothing very special to report as to the condition of the several stations. They were all in thorough repair and in good working order, and proved sufficient for all requirements, including the heavy demands upon the association in supplying the gas for the great Exhibition in the "Prater" at Vienna. The conduct of the business and generally the affairs of the association have been superintended by Mr. G. W. Drory, ably assisted by the engineers and agents at the several stations.

Secondary Products.—The value of the secondary products, coke, tar, and ammonia, was 68·04 per cent. of the cost of coal, being a decrease of 5·65 per cent. on the preceding half year, and 0·49 on the corresponding half of 1872.

The rental for the half year now under consideration was larger by £44,264 than for the half year ended June 30, 1872, but notwithstanding that increase, the profit was less than in the corresponding half of 1872—viz., £136,653 instead of £157,338. This diminution is due principally to the additional cost of coal, which amounted to £45,567, the diminished proportionate value of the secondary products, £1761; and the increased cost of labour, £5189.

The result of a comparison between the prices of coal as shipped from England during the past half year, and the prices of the coal as shipped from this country during the corresponding half (and indeed during the whole of the previous year, 1872, as the contracts extended over that period) shows, on an average, an increase of more than 100 per cent. But taking the entire quantity of coal employed at all the stations from all sources, including all expenses of freight, &c., there appears an increase of 9·2 per cent. on the preceding half year, and of 16·13 per cent. on the corresponding half year of 1872.

The total increased cost of coal in the first half of 1873, as compared with the corresponding half of 1872, amounted to about £75,662, of which about £30,000 are attributable to increased quantity of coal consumed, and (about) £45,000 to increase of price.

The outlay for the necessary extensions of works and mains during the half year now under consideration was very considerable.

At Vienna, additions and extensions of various kinds, including a set of purifiers and retorts at each of the stations of Erdberg and Tabor, were carried out, besides important work at the other establishments. And in addition 10,109 yards of mains of various sizes were laid in the "Prater," and 1227 extra street-lamps were put up for lighting the Exhibition. The above-named extensions and additions involved an outlay of nearly £46,000.

At Aix-la-Chapelle a large sum was expended in various large additions and necessary alterations.

At Hanover, by the erection of a set of new purifiers, extensions of mains, and by other work, a large cost was also incurred; as likewise at Berlin, by the considerable extension of mains which had become necessary; and at Lille, by the replacing of a condensing main, by the preparations connected with the new gasholder now in course of erection, and by sundry other works.

At Amsterdam, Antwerp, Frankfort-on-Maine, and Ghent, large quantities of new mains, amounting in the whole to about 34,000 yards were laid, besides various fittings.

The total sum expended in extensions and additions at the various stations of the association during the first half of 1873 was (about) £65,800.

The only noteworthy fact with regard to the price of gas is, that at Frankfort-on-Maine the permission to raise the price was twice refused by the authorities to this association, and also to the New Frankfort Gas Company, notwithstanding the strong proofs given by both companies of the large increase of the cost of production and the consequent reduction of the profit on the workings to an unremunerative point:

At Antwerp negotiations were carried on, and are still pending, with the municipal authorities for a new contract. With regard to the contracts in those towns where the

existing contracts expire in the course of a few years, the board have been unremitting in their endeavours to arrange with the various authorities reasonable terms for the continuation of the lighting, but hitherto without satisfactory result.

The president and directors, in conclusion, desire to draw the attention of the shareholders to the accounts for the half year ended the 30th of June last. These have been duly audited, and from them the directors have, in accordance with the provisions of the "Companies Clauses Consolidation Act," prepared a scheme showing the profits of of the association for the last half year, and the portion thereof applicable to the purposes of dividend, which the president and directors recommend now to be declared—namely, a dividend of £1 15s. per share, payable, free of income-tax, on and after the 15th day of December next.

The CHAIRMAN: Gentlemen, in proposing to you the adoption of the report which you have just heard, I ask you to give me leave to trespass upon your attention for a few minutes, while I refer, at greater length than is done in the report, to some of the topics which are there mentioned, and also to mention one or two occurrences which happened since the close of the half year embraced in the report, and which may be of some interest to you. In the first place, I will first refer to that part of the report, which is the least agreeable—viz., that part which recommends you to declare a dividend smaller in amount than we have received during the last four years. And in so doing, I would first bring under the attention of the shareholders the principle upon which this association has acted for a great number of years. I would ask you to go back, in the first place, to the time when, as the old shareholders will remember, we had four different capitals, which capitals were amalgamated in the year 1858. When I speak of dividend, I mean to include bonus also. In 1858 the dividend declared was 17s. 6d. per share, amounting in the year to £49,000. In the year 1862, the dividend was raised to 27s. 6d. per share, which required £77,000 in the half year. In 1863 a further increase was made in the dividend to 30s. per share, which dividend required a total sum of £84,000. In 1865 the dividend was again raised to 35s. per share, requiring in the whole £98,000. In 1869 the dividend was raised to £2 per share, at which it has stood ever since, requiring an annual sum of £224,000—*i.e.*, £112,000 each half year. Now this shows a gradual, but a very satisfactory increase, and at no time has there been any necessity for a retrograde movement. I can recollect, before I had the honour of a seat at the board, that the directors were obliged to reduce the dividend, a fact which was attributed by many of the shareholders to the extravagance of the directors, in having recommended, at an earlier date, larger dividends than the profits of the company could continue to pay. I remember the storm of anger at that time was so severe, that no director would now wish to repeat the experiment. In 1863 our profits were £280,000; the dividends amounted to £168,000, and there was reserved for extensions and contingent outlay a sum of £84,000. In 1865, when the dividends were again raised, the profits were £306,000; the dividend was £196,000, and there was reserved for extensions a sum of £83,000. In 1869, when there was another rise, the profits were £345,000; the payment of the dividend required £224,000, and there was reserved for extensions and necessary outlay £102,000. These sums which have been appropriated for extensions are the amounts which experience has shown to be absolutely necessary to keep up the efficiency of the undertaking. The principle which has been adopted has been of this character. If you receive an amount of dividend from Consols, or any other invested property, it is quite clear that the sum so received may be fairly treated as income or profit legitimately divisible amongst those entitled to the property. But if you derive the income from a trading company, which is the balance between money received and money paid, it stands in a different position on account of the difference of the security upon which it is held. In the case of Consols, you know that the principal is safe, and that what you receive as interest or dividend you may safely divide; but in a trading company you have to consider the security for that interest or dividend in the future; and if you find that it cannot be secured without an outlay of £20,000, or £100,000, or £200,000, you will, if you act wisely and prudently, set aside that sum of money for the purpose. Otherwise you cannot consider the income you now divide to be protected by any adequate security. That is the principle upon which the shareholders in this association have always acted, and the wisdom and prudence of the course has been shown by the success which has attended us. In many gas companies in this country a similar provision is made by a depreciation-fund, which this association has never established. Now, in the last three years (1870, 1871, and 1872,) there has been reserved for the purpose of extending our works, and keeping them up in an efficient state, a sum of £312,000: and the expenses which have been unavoidably incurred—partly from the very great rise in the price of coal, and partly from the enormous sums absolutely required to be expended by us at Vienna, in consequence of the late Exhibition, beyond our ordinary wear and tear in these three years—have amounted to £357,000. Without the expenditure of this money it is impossible to tell what would have befallen us. We contract at Vienna to light all the town, and we have been required by the town authorities to put up additional lights in the place where the Exhibition was erected. If we had failed to do so, the town would have put them up at their own expense, and have deducted the sum from the next amounts they had to pay us. Now, before we spend the money, we must necessarily have it to spend, and at the present time the only source from which we can derive it is the surplus of our income. If the outlay at Vienna would have produced an extra amount of rental, adequate to pay the dividend on the extra sum expended, our course would have been clear, either to issue new shares or to increase the amount of our debentures, or to make a call upon the existing shares, or some plan of that kind. But if the amount expended at Vienna produced little or no additional income, and we fail to pay it out of our ordinary income, to that extent we injure and diminish the security for the dividends we are declaring and have been declaring for some years past. We have, therefore, had no alternative but to spend the money out of our earnings, and we are only too glad that our earnings have been sufficient to enable us to make the outlay. With regard to the profits for the present half year, the sum which has been recommended to you to pay in dividend on this occasion will leave £38,655 for extensions. That sum of £38,653 is undoubtedly deficient to pay for all the outlay we shall be compelled to make in the current half year. Fortunately, as you are aware (and as is mentioned in the report), the municipality of Cologne have purchased our works there, and the money they have paid us—it is only a part payment at present—has come at a most opportune time, to enable us to keep up our works efficiently at the different stations we hold. Without that money we should have had to expend that small sum of Consols we hold, and which we are endeavouring to keep intack to the last. We treat the money paid at Cologne as we should have treated funds derived from an additional call, or raised on debentures—it is capital hitherto employed at Cologne, and now employed at Vienna and other places. There is one item in our accounts to-day which is rather encouraging, and that is with regard to the value of the stocks we hold. Of course, as our works extend we are obliged to keep larger quantities of coal, coke, and other material, and we have had a return of the value of our coal and coke only up to October last. In 1871 the value of those two articles was less by £82,000 than it was in the October of the present year, the calculation being, I believe, based upon the price actually paid for the coal. That coal will hereafter be converted into gas which will bring us in a considerable rental, but at the present time it leaves our supply of ready money very low. We have invested our cash in this article, which is hereafter to produce the manufactured article which yields income. Under these circumstances, the directors have unanimously come to the conclusion that we should be departing from all the wise and prudent principles upon which the association has acted almost from its foundation if we refrained from the disagreeable task of recommending you, for once, to make a backward motion, and declare a dividend of £1 15s., instead of £2 per share. I believe there are many gentlemen here who are well acquainted with the proceedings of other gas companies, and though many of us may regret this state of things, there are not many who will be much surprised or disappointed. There are just one or two further points to which I would refer for a moment. With regard to our works at Bordeaux, it was stated at the last meeting that we were in treaty for a renewal of the contract there, and we pledged ourselves to offer such terms to the municipal authorities that they could not well refuse our offer. We have endeavoured to carry out our pledge, and we made them such proposals as we thought would, at the same time, leave us a fair and reasonable remuneration, and be more advantageous to the town than any other offer they were likely to receive. The results of our negotiations have much disappointed us. We did make an offer, which was considerably below the offer of another—a French company; but the municipality, from what motives it is impossible to say—whether they were influenced by considerations that our rivals were a native company, I do not know, but they did think proper to accept their offer, and did it in a manner which we certainly have not been able to reconcile with any notion of fair dealing towards us. It would be improper for me to enter into any details of the case, because the matter is still pending; but we felt they were of such a character that we were bound to bring them before the Conseil d'Etat. In this state of circumstances, we much missed the assistance of our friend, Mr. Drory. His experience and knowledge of such matters were exceedingly wanted on this occasion at Bordeaux, but his health would not allow him to undergo the labour and anxiety of such a negotiation; and we have not been fortunate enough to find any one, either from our assistant engineers or otherwise, whom we could appoint, to give him and us such assistance as we may not frequently require. But, fortunately, a member of our board came to our aid. Mr. Julian Goldsmid was good enough to go to Bordeaux, and subsequently to Paris, to protect our interests, and it is a great gratification to me to have this opportunity of expressing publicly how greatly we are all indebted to him for the tact, skill, and judgment which he brought to bear upon the matter. Not only did he do everything in the most prudent and discreet manner, but—what is no less difficult in such delicate negotiations—he abstained from doing anything or taking a step that in any way could be injurious to us. By him the question was brought before the Conseil d'Etat, and as we firmly believe that the truth and honour and justice are on our side, and know what may always be expected from the conseil, it would be a gross injustice to that distinguished assembly if we were not to express a hope that their decisions will not be adverse to us. With regard to Cologne, it will be also in the recollection of the meeting that the City were about to buy our works. The arrangement for that purpose was completed, and the works were handed over to them last May. Part of the purchase-money has been paid to us, and part is still the subject of negotiation, but I hope it will be settled before long. In the meantime we find one source of satisfaction in the manner in which the authorities there have proceeded. We wished them to allow us to increase the price of gas there, but they refused. They considered we were sufficiently paid, and that, out of justice to the consumers, they could not permit us to raise our prices. They took the works into their own hands, and made gas on their own account. But they had not proceeded to do so many months before they found it necessary and expedient first of all to abolish the discounts to large consumers, which we had allowed. In a short time they were reduced to the further necessity of increasing the cost of gas rather more than 30 per cent. This is in some degree satisfactory to us, as it shows the good faith and wisdom of our own proceedings, and the skill of our own engineers. We could make remunerative that which the town could only carry on at a loss. Still, it is vexatious for these municipal authorities to learn wisdom at our expense. At the same time, we know there is a similar feeling among the governing bodies of some of the other towns we light. They are not well acquainted with the details of making gas, and they imagine that it is a much easier process than it is, and that the profits are larger than they find them to be after a little experience; and we may fairly hope that the warning that Cologne has given will make other towns more prudent. The fact that the consumers pay more when they are in the hands of municipal authorities than when they are supplied by a company like this, may perhaps influence the votes of some gas consumers, and make us rather more secure in the stations we still hold. I do not think there are any further observations I can usefully make; and, therefore, I shall conclude by moving—"That the report be received and adopted."

Mr. RAWLINS said there was one part of the report which seemed to require a little explanation, and that was with reference to capital and income, which he maintained should be kept entirely distinct from each other. According to the chairman's statement, a large sum of money had been annually paid out of net profits for the extension of works, which money ought to be divided among the shareholders. At the meeting of the association a year ago, the chairman made this remark: "As we have extended our works, and now make such large quantities of gas, the annual amounts for depreciation and for enlargements are increasing in the same proportion, and they seem likely to come to so large a sum before many years have passed that it seems doubtful whether, in justice to the present generation of proprietors, all that outlay can be met from profits." Now he (the speaker) admitted that there ought to be an ample sum set apart as a reserve-fund to meet contingencies, but he thought it was wrong to expend profits in the extension of works, and he did not know any other company which did so. When extensions became necessary they should be provided for by calls on existing shares, or by the creation of new shares. At the meeting referred to, the chairman said that they had been obliged to take something also from the reserve-fund for the purpose. Now the net profits for the half year then under consideration were £148,000, the dividend absorbed £112,000, and seeing there was therefore a difference of £36,000 applicable to contingencies, he was at a loss to understand why it should have been necessary to take anything from the reserve.

The CHAIRMAN referred the speaker to a remark at the close of the report of that meeting: "We take from the reserve-fund not exactly for the purpose of paying the dividend, but for the purpose of providing the sum necessary to pay for extensions."

Mr. TURNER said he was surprised at the figures laid before the meeting. If the report was adopted there would have been carried over £93,000 for the past year. This he felt sure must be in excess of anything that could be required, even taking into account the unremunerative outlay at Vienna. In his opinion, £78,000 was ample for the year, and if the directors confined themselves to that they could pay the usual dividend of £2 per share on this occasion. As to the high price of coal, he believed the coal difficulty was now over, therefore the directors had nothing in that way to apprehend. He knew it was useless to protest against the decisions of the board—the shareholders hands were tied; but he was sure if an appeal were made to the Court of Chancery the directors would not be allowed to carry over so large a balance and reduce the dividend as they had done.

Sir FRANCIS H. GOLDSMID, Bart., M.P., said as the two honourable proprietors who had spoken appeared to him to go upon a mistaken notion as to what was the real meaning and the real necessity of extensions in a company like this, he would venture to say a few words on the matter to which the attention of the board was called. The honourable proprietor lost sight of the difference between a company like this and a railway company. If a railway company made an entirely new branch, which they might either make or abstain from making, and then proposed to pay the cost out of profits applicable to dividend, the shareholders might well say it was going too far. But, in the case of this com-

pany, the extensions were not works made by the board at their pleasure, but works which must be carried out, or the company would not be able to carry on their business. Constantly, year by year, did these unavoidable extensions come upon them, and to say that these should be paid for out of new capital raised for the purpose, while the profits were being divided to the full or nearly the full extent, would be to embark in a course which must soon end in ruin. The result would be that first at the time when the concern was least profitable the company would be obliged to attempt to issue new shares. Was that a course which business men would recommend? He imagined not; but that the proper course was that which the directors had pursued. He would call the attention of the honourable proprietors to the fact, that in former years the company had really reserved a much larger proportion of profits for the purpose of making extensions, than was proposed to be done on this occasion. His own doubt, if he had any, was rather this—whether they were sufficiently acting on the good old rule of taking the greatest care not to make the dividend higher than they were likely to be able to maintain. Were honourable proprietors really disappointed that the former rate of dividend was not now recommended? They were no doubt aware, as all the rest of the world, that the main article which the company had to buy in order to make gas, had doubled in price, while the company were not in a position to raise the price of the manufactured article. It seemed to him the most natural result, that the dividend should be reduced, and instead of being surprised that it should be so, the wonder was that the reduction was not greater.

Mr. Bassett, M.P., said he felt as his friend Mr. Turner did, considerable disappointment at the announcement from the chair. If the directors had recommended a dividend of £2 per share, there would still have been nearly £26,000 to be carried over, making for the whole year upwards of £70,000 for extensions. He was quite willing to give the directors credit for a desire to maintain the dividends, but on this occasion he feared they had allowed themselves to be influenced too much by a little "Conservative reaction." However, the shareholders were powerless, and their only course was to "rest and be thankful."

Mr. Filer asked whether any, and, if so, what steps had been taken to dispose of the company's property at Marseilles and Toulouse.

Mr. Vaughan Richards said if he rightly understood that the extensions referred to by honourable proprietors had been paid for out of the proceeds of the sale of the works at Cologne, he did not see anything to take exception to. That money strictly belonged to capital account, and its employment for extensions elsewhere was a perfectly legitimate expenditure.

The Chairman, in replying, said: I must beg to express my regret that some of our old shareholders should be dissatisfied at the decision to which the directors have come. But, with great respect for their opinion, I think there are some points which they have overlooked. In the first place, with regard to the reserve fund—*i.e.*, the fund set aside for contingencies—it is said, and said truly, that we have set aside a very large sum for the last two or three years. Mr. Turner says it is £90,000, and surely that is sufficient. Now, at Vienna alone, during the last twelve months, we have been obliged to lay out £112,000, in addition to large sums at other stations, without getting any return for it. It is said we might have raised that money by issuing new shares or by calling up money on debentures. I think I said last year that the directors were very anxious to avoid, as far as possible, trenching too much upon the income of the association, and that, whenever they could see their way to pay a fair dividend upon an increased capital, they would give the proposition their best consideration with every wish to adopt that plan. But, supposing we had adopted it now, what would have been our position. In the first half of 1870 our profits were £171,000; since that time we have spent upwards of £300,000. Now, I appeal to any honourable proprietor who is connected with other gas companies, whether it would be unreasonable for us to expect 10 per cent. upon that £300,000. If so, it would raise the profits from £171,000 to £186,000 in the half year. If we saw our way to get that profit, we should be inclined to adopt the plan; but in the present half year we find, in spite of our additional expenditure of £300,000, that our income is only £142,682. We may divide the whole of our income in any one year, if the proprietors think well to do so; but supposing we had done that in 1870, what would have been the result? If we had to distribute the £142,682 (the amount of the last half year's profits) not only over our present capital, but over an additional capital of £300,000, and repeat that process from year to year, our dividend, instead of being £1 15s., would very soon be reduced to £1 5s. One honourable proprietor has held out the prospect of a reduction in the cost of coals. I hope it may be realized. But during the current half year—July, August, and September—the price we have had to pay for coal has pressed more severely upon us than during any three months since the company was established. And the price of coal must affect our profits more seriously in the current half year than in the previous one, because it is regulated by the contracts entered into before any reduction. I feel bound to tell you that our prospects in this respect are more gloomy than they have been. With regard to the property at Marseilles and Toulouse, no steps have been taken with the view of disposing of them. It is a long time since we were driven out of Marseilles, and it is some years since we had to give up Toulouse. But the contracts now existing there are not interminable, and we do not give up all hope of again lighting these towns. We shall probably tender when the time comes, and we hope that the profits we may realize from new contracts will be more to our advantage than the sum of money we should receive now if we sold the works. The works now are unusable as a manufacturing establishment, and the mains in the streets would only realize the value of old iron, *minus* the expense of getting them out of the ground. The chairman, in conclusion, read a letter from the president of the association, Sir Moses Montefiore, expressing regret at his inability to attend the meeting.

The motion for the adoption of the report was put, and carried unanimously.

The Chairman moved—"That a dividend of £1 15s per share on the 56,000 shares of the association be declared for the half year ending June 30 last, and that the same be payable, free of income-tax, on the 15th of December next, as recommended in the report."

The motion was put and carried.

The Chairman: I beg now to move—"That the thanks of the meeting be presented to Mr. Drory and the engineers of the association for their unremitting attention to our affairs."

Mr. Turner seconded the motion, which was put and carried.

On the motion of Mr. Turner, seconded by Mr. Bassett, M.P., a cordial vote of thanks was given to the president and directors for their successful management of the business of the association, and to Mr. Twells for his able conduct in the chair.

The Chairman returned thanks on behalf of the board, and also thanked the proprietors for their attendance.

The proceedings then terminated.

Odessa Water-Works.—A telegram has been received from Odessa with reference to the extensive series of water-works which have been constructed by this company. It appears that the entire works are on the eve of completion, and by this time it is expected the water is flowing into the city. Extensive preparations are being made by the authorities to open the works with *éclat*. A large number of troops have been ordered down to Odessa, and it is expected the Emperor of Russia will visit the city, and open the works in person.

ORIENTAL GAS COMPANY, LIMITED.

The Ordinary General Meeting of Shareholders was held at the Terminus Hotel, Cannon Street, London, on Thursday, Nov. 27—Walter Thomas Fawcett, Esq., in the chair.

The Secretary (Mr. A. Hersee) having read the advertisement convening the meeting, the following report and statements of accounts were submitted:—

Your directors beg to submit a statement of accounts for the twelve months ending the 30th of June last. The progress of the company during the year, though not rapid, has been satisfactory, and the revenue has increased in fair proportion.

In public lighting there has been the addition of 25 jetty lamps, referred to in last report, and an order has just been received for the lighting of 25 additional street-lamps.

The use of gas for private consumption continues to extend. During the past financial year 75 new consumers and 2030 burners have been added, making the total numbers of lights on the 30th of June last (including Howrah), public 3408, private 32,122, compared with, respectively, 3382 and 30,092 on June 30, 1872. The bazaar lights now in operation amount to 600.

Your directors have pleasure in reporting that an Act has been passed by the Legislative Council of Bengal, giving power to the municipality of Howrah to levy a lighting rate. It is expected that this will be followed by an early order for additional street-lamps in new districts, where increased private consumption of gas may be also anticipated.

The works and machinery, both at Calcutta and Howrah, are in efficient order. The new engines and exhausters for Calcutta are in course of manufacture, and will be shortly sent out.

It is with much satisfaction your directors refer to the fact that a full supply of coal at reasonable prices is secured for the next two years.

The extensive sanitary works performed and still being carried out by the municipality, including the execution of side drains, water connexions, and other minor works, have occasioned further injury to the mains, and delayed the expected reduction of the leakage; but the company's staff are unremitting in their efforts, and the systematic measures adopted must result in effecting a remedy ere long.

The action to recover compensation for the loss inflicted upon the company by the drainage and water operations in Calcutta has been withdrawn, upon an agreement by the municipality to bear the legal expenses, and the former friendly relations existing between the authorities and the company are now resumed.

By the death of John Allan, Esq., and the resignation, through failing health, of Lewis Cubitt, Esq., your directors have lost the valued co-operation of two esteemed and efficient colleagues. The vacancies have been filled, in accordance with the regulations of the company, by the election of John Fisher, Esq., and John Robinson Peill, Esq., whose extensive experience in the management of other important and successful gas undertakings and large interest in this company entitle them to the full confidence of the shareholders. Both these gentlemen retire from office on the present occasion, and offer themselves for re-election.

Owing to the election of Mr. Peill to a seat at the board, the appointment of an auditor became necessary, and Mr. T. N. Stokes (auditor of the Imperial Continental, and Mauritius Gas Companies) was appointed to examine the accounts for the past financial year. Mr. Backler and Mr. Stokes retire from office at this meeting, and offer themselves for re-election.

The general revenue account shows a balance of £11,770 6s. 5d., out of which it is proposed to pay a dividend of 5 per cent., free of income-tax, on the 4th proximo, making, with the interim distribution of 4 per cent. on the 4th of June last, a total dividend of 9 per cent. for the year.

Your directors cannot conclude their report without expressing their renewed acknowledgments of the valued assistance rendered by the resident committee in Calcutta (Messrs. E. Broughton, R. C. Noble, and W. H. J. Wood) in advancing the interests of the company; the exertions of the engineer and manager, Mr. Blackburn, also deserve especial mention.

Dr. *Balance-Sheet, June 30, 1873.* *Cr.*

30,000 shares of £5 each		£150,000	0	0	Amount of plant on the 30th of June, 1872	£254,200	10 4
30,000 do. (50s. paid)		75,000	0	0	Outlay during the past 12 months	4,115	11 8
		225,000	0	0			
Loans on debentures		69,820	0	0			
Unclaimed dividends		644	8	9	Cost of plant to the 30th of June, 1873	258,316	2 0
Reserve-fund		6,409	16	10	Services laid and meters in use	5,538	4 9
Amount due by the company		3,828	15	10	Amount due to the company	8,415	1 11
Balance from general revenue account		11,770	6	5	Value of stocks, viz.—		
					Coals	6,235	17 3
					Purifying material	123	4 10
					Products	1,832	15 1
					Fittings and meters	7,844	17 7
					Pipes	8,032	18 0
					Horses, conveyances, &c.	500	0 0
					Sundry stores	6,413	4 8
					Office furniture, &c.	420	5 4
					Balance in London	5,161	16 6
					Bills receivable	8,638	19 11
		£317,473	7	10		£317,473	7 10

Dr. *Profit and Loss, for the Twelve Months ending June 30, 1873.* *Cr.*

Manufacture and distribution—					Gas-rental	£43,396	3 0
Coals used, purification, and wages	£19,101	13	8		Coke, tar, fittings, &c.	10,673	2 8
Salaries in India & London	2,585	17	0			54,069	5 8
Directors and auditors	913	0	0		Transfer fees	13	11 6
Passage & general expenses	956	5	9				
Loss on exchange	1,227	17	5				
Licence-tax	228	14	7				
Reserve-fund	305	4	8				
Mains account	2,569	19	9				
Wear and tear and repairs	2,054	2	4				
Bad debts and allowances	108	11	3				
	£30,051	6	5				
Balance	24,031	10	9				
	£54,082	17	2			£54,082	17 2

Dr. *General Revenue Account, June 30, 1873.* *Cr.*

Dividend of 5 per cent. balance of 9 per cent., for the 12 months ending the 30th of June, 1872, declared at the general meeting, November, 1872	£11,250	0	0		Balance on the 30th of June, 1872	£11,667	10 4
Interim dividend of 4 per cent., on account of year ending the 30th of June, 1873, paid June 4	9,000	0	0		Do. on profit and loss account	24,031	10 9
Interest on debentures	3,306	0	8				
Income-tax	372	14	0				
	£23,928	14	8				
Balance	11,770	6	5				
	£35,699	1	1			£35,699	1 1

The Chairman, in moving the adoption of the report, said the affairs of the company were in a better state than they were this time last year, and the directors were able with confidence to recommend the dividend mentioned. Some of the difficulties with which they had had to contend had disappeared, or been materially lessened, and the prospects of the undertaking generally were encouraging. The increase in the private lighting was about equal to the average of past years, and it was gratifying to find that the majority of the new consumers were amongst the resident natives. The leakage was still in an unsatisfactory state, and it must be to an improvement in this direction, as well as in the increased consumption of gas, that they must look for any great addition to the dividends. He was pleased to say that the company had a most excellent staff of officials, who were doing all in their power to reduce the loss by leakage. During

the past few years about 10 miles of mains had been relaid, and so far as the directors knew the whole system of mains was in a much improved condition. With reference to the dispute with the municipality of Calcutta, the report had already informed the proprietors that the directors, although they knew they had right on their side, had come to the conclusion, after the most serious consideration, to abandon any further legal proceedings. They had been reimbursed the costs incurred up to the present time, and they felt that, having regard to the interests of the company, it was wiser to put up with the damage sustained to their works, and thus re-establish their former friendly relations with the municipality. He was happy to state that they were now on the most friendly footing with the authorities, and there was reason to hope that they would go on hand in hand for the future. He believed and hoped that the shareholders would consider that the directors had acted for the best in staying further proceedings and putting an end to all unpleasantness with the authorities. It was stated in the report that there was every probability of a lighting rate being levied in Howrah. Such being the case, there was little doubt that, as soon as the bridge connecting Howrah with Calcutta was completed, there would be a large amount of lighting in that district. During the last week the diretors had had an intimation of an increase in the public lights there. In consequence of the lamented death of Mr. Allan, and the retirement, through infirm health, of Mr. Cubitt, there had been two vacancies occasioned at the board, which the directors had filled up by the appointment of Mr. Fisher, one of the largest shareholders, and a director of the European and Continental Union Gas Companies, and Mr. Peill, a director of the Chartered Gas Company and formerly an auditor of this company. These gentlemen retired on the present occasion, as also did the auditors, and offered themselves for re-election. With these remarks he moved the adoption of the report.

Mr. WHITE seconded the motion, which was put and carried unanimously.

On the motion of the CHAIRMAN, seconded by Mr. STOPFORD, the retiring directors were re-elected; and on the motion of Mr. HADLAND, the auditors were also reappointed.

Mr. H. M'L. BACKLER, in acknowledging his re-election as auditor, expressed the gratification he felt in having associated with him a gentleman of such large commercial experience as Mr. Stokes, and said the shareholders might cherish the fullest confidence that the accounts of the company would always be presented to them after the most rigid scrutiny so long as their investigation was entrusted to their care.

The CHAIRMAN moved—"That a dividend of 9 per cent., for the twelve months ending the 30th of June last, be declared, and that the same be paid to the shareholders, free of income-tax, on the 4th of December, less 4 per cent. interim dividend distributed in June last."

Mr. FISHER seconded the motion, which was put and carried.

The CHAIRMAN moved a vote of thanks to the resident committee for their careful attention to the local interests of the company. He had much pleasure in moving this resolution, and he was sure the shareholders would be glad thus to give a fitting recognition of the valuable help rendered by the committee in carrying on the concerns of the company.

Mr. STOKES said he was much pleased to second the motion, the more so that, having just gone through the accounts, he could vouch for the care bestowed by the committee on the matters which came under their control and management.

The motion was put and carried.

The CHAIRMAN, in moving a vote of thanks to Mr. James Blackburn, the resident engineer and manager, said that gentleman was worthy of all praise for the ability and energy which he displayed in the performance of his duties. Mr. Blackburn had the entire confidence of the directors, and it would be a satisfaction to him to know that the shareholders at large appreciated his services.

Mr. WHITE seconded the motion, which was put and carried.

On the motion of the CHAIRMAN, seconded by Mr. STOPFORD, a vote of thanks was also given to the secretary.

Mr. HERSEE acknowledged the vote.

The proceedings closed with a vote of thanks to the chairman and directors.

BOX'S ANTI-DIP VALVE.

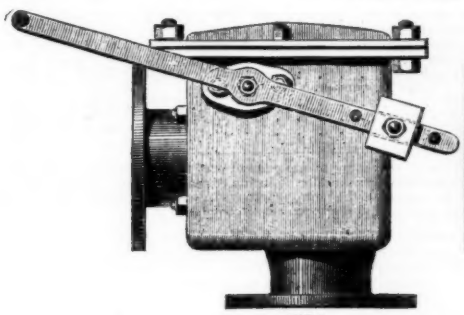


FIG. 1

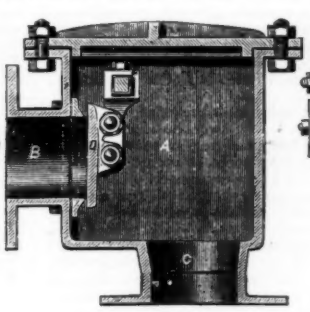


FIG. 2

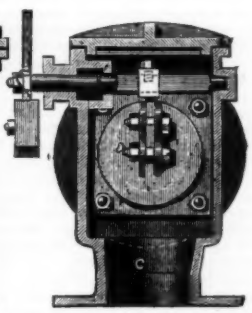
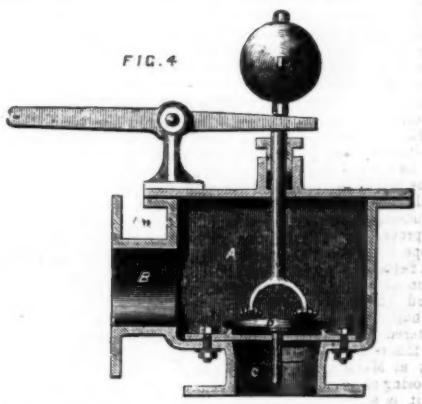


FIG. 3

With but very few exceptions, it is admitted that great advantages are derivable from the removal of the extra pressure induced by the dip in the hydraulic main, and with this view the present invention has been devised. It will be seen, on referring to the diagrams, that a chamber, A, is connected to the ascension, or bridge pipe at B, and with the main at C. Within the chamber a valve, D, is hung upon a spindle, which is operated upon by a weighted lever on the outside. The valve has a flat surface, and sets against or upon a seat with a V-shaped or very narrow edge. Fig. 1 is an elevation, fig. 2 is a transverse section, and fig. 3 a longitudinal section, while fig. 4 represents a modification of the previous form to suit places where, from want of space, the other arrangement might be inadmissible. Its use will be apparent on inspection, and all that need be said is that when the retort is charged and the lid secured, the workman will pull down a rod or chain fastened to the lever, and attach it to some part of the lid fittings, when the valve will be opened, and a free passage formed for the flow of gas to the main, which need no longer be hydraulic when this invention is used, but simply a conducting main or pipe to the condensers or other apparatus. When the retort is to be discharged, the workman will release the chain, upon which the valve will fall, and thus prevent ingress or egress of gas or air.

FIG. 4



HEREFORD (CORPORATION) GAS-WORKS.

The Annual Meeting of the Hereford Town Council was held on the 10th ult.—the MAYOR (Alderman Boseley) presiding.

The Gas Management Committee made a report, which was as follows:—

Your committee in their last report called attention to the fact that it was necessary for the council to decide whether the requisite sum to pay the instalments of principal and interest on money borrowed to pay for the purchase of the gas-works should be provided entirely from the profits of manufacturing gas, or whether the instalments should be provided from the general fund of the corporation. Your committee must ask for an immediate decision on this point, as upon it must depend the price to be charged for gas. Your committee suggest for the consideration of the council that probably the most equitable course will be for a fixed proportion of the instalment of principal to be paid by the general fund. The instalments will increase year by year to the same amount as the payments for interest decrease, and therefore the annual burden will be felt by those who are most likely to profit by the possession of the gas-works when cleared of debt. Your committee feel much pleasure in reporting that the consumption of gas is considerably on the increase, the consumption during the last three months being 1,239,000 cubic feet more than the corresponding period of last year. Should this increased consumption continue during the depth of winter it will severely try the capacity of a portion of our plant, our manager having reported that at times last winter he had great difficulty in passing the gas through the intermediate plant between the retorts and the gasholders.

Mr. JAMES thereupon moved the following resolution:—

That the report of the Gas Management Committee be received. With reference to the direction asked for by them, the council are of opinion that the Gas Committee should charge such a price for gas as will enable them to defray the cost of production with a proper allowance for depreciation of works and plant, and the interest of the purchase money for the works (which is equivalent to rent) and in addition a fair commercial profit. The profit so raised should be applied in discharging the instalments of purchase money, and if it be insufficient for that purpose the deficiency should be provided out of the general funds of the city.

He thought it was not to be gainsaid that the council had no right to carry on a commercial transaction for the benefit of any class of consumers, and that they should not embark in any such transaction unless for the benefit of the whole body of the ratepayers. If that principle was admitted, the rules by which they should be governed in fixing the price of their gas were clear. They ought to charge such a price as would recoup them for all the costs of production, such as coal and wages, with a fair allowance for the annual depreciation of works and plant and the interest of their purchase-money (which was equivalent to rent), and in addition to those a fair trading commercial profit. If they charged a price less than that they would do an injustice to the producer, and if they charged more than that they would do an injustice to the consumer. What amount of profit it was proper to raise it was impossible to fix. They might, however, obtain information from neighbouring towns that would enable them to say what would be a fair amount of profit to make on their work. Well, then, having made some profit, the question remained how that profit was to be applied, and beyond question there was no way so proper as to apply it towards the payment of the purchase-money for the works that they had recently bought. There remained, however, a contingency which he was afraid would become a fact, namely, the case of the profits not amounting to the whole of the instalment of purchase-money. Then how was that deficiency to be met? There were two ways. It might be met either by raising the price of gas to such an extent as would produce sufficient profit to pay the whole instalment, or by paying it out of the general funds of the city. If they were to adopt the first of these plans, and were to increase the profits so as to raise the whole instalment, they would inflict a gross injustice on the consumers of gas. There was no reason why the consumers should pay too high a price for the gas merely to pay the purchase-money of the estate which would become not their property only but the property of all the citizens alike, and from which when the purchase-money was paid off all would derive profit. If they adopted the second plan it would meet the justice of the case, because the consumers having paid a fair price for the article they consumed, the ratepayers could not complain if they were called upon to pay some portion of the purchase-money. Whether it was for the benefit of the city or not that they should lease themselves for 30 years, so that the citizens at the end of that period might derive the profit arising from the works, need not now be discussed as the question had been disposed of. The question then to be considered was how to deal with the existing state of things. The citizens at large would not complain of contributing something towards the purchase of the works, bearing in mind that they were only called upon to pay part. With regard to the suggestion of the committee that a fixed portion of the instalment of purchase-money should always be raised by taxation,

he could not concur in that view; because, if a fair trade profit should produce the whole instalment, it ought to be so applied, and no portion be paid by taxation. There was no reason why they should supply gas at less than a fair trade price to benefit the consumers. The works should be carried on upon the same principles as if they had remained the property of the old company. If the fair profits did exceed one-half or any other proportion of the instalment, it would not be wrong in a financial point of view. The consumers must see that they were not unduly taxed, because if their profits were applied in the payment of the purchase of those works, they in common with the other ratepayers would participate in the income to arise from them.

Alderman ANTHONY thought the plan of the Gas Committee to treat the works the same as a commercial concern, paying a fair and reasonable profit upon their business, was the correct thing. If they continued to act on this principle the increased consumption of gas would give them a profit which, in the course of time, would gradually pay off the debt without being a burden either upon the present or a future generation.

Mr. KNIGHT said one way to ascertain what was a fair profit was to learn from any gentleman connected with the old company what profit they made in working the concern.

The motion for the adoption of the report was put and carried.

MR. GARROLD, in seconding the motion, said the resolution satisfied him, because it adopted a principle which he had always upheld—namely, that the revenue of the gas-works should not be wholly taxed for paying the entire purchase-money of those works. He had always contended that, inasmuch as the whole city benefitted by the purchase, the whole city should contribute to the cost. The resolution, although it did not state what part was to be paid by the consumers or by the ratepayers generally, did lay down the principle that if the profits were not enough to pay the instalments, then the balance was to be paid out of the rates of the city. At the present time they were in a fortunate position, because they had been enabled during the year to carry on the works without increasing the price of gas, notwithstanding the price of coals was nearly doubled, and therefore if the committee were obliged to make an increase—and he was afraid they would have to make a slight increase—they ought not to be found fault with by the consumers in Hereford. Speaking from memory, he believed the average price for coal now was 4s. to 5s. per ton more than last year, and that of itself would warrant an increase in the price of gas. He hoped they would be able to get over this winter without coming to the council for any more money to increase their works. No doubt when they were obliged to do so the corporation would be very glad to see them and to find the money necessary to extend their works. Private individuals would be glad to find their business so far increased as to need extension of works, and no doubt the corporation would also.

Mr. KNIGHT said he thought the resolution would meet the equity of the case as well as could be under the circumstances. He believed he should not be doing wrong if he mentioned that when he examined the accounts he found that the charge for lighting the public lamps was nearly, if not quite, double. [Mr. PARRY: 33 per cent.] He thought it was a great deal more. The finance clerk would perhaps tell them what were the amounts charged this year and last.

The MAYOR said that during some part of 1872 the lamps were not lighted.

The FINANCE CLERK said he thought the increase was about £400 per annum.

Mr. KNIGHT said there was a very important alteration made during the year, which bore considerably on the question of those inside and those without the city area of lighting. Formerly the calculation was made only on the area within which the lighting was allowed, not over the entire city. That was an important consideration, and must be taken into account. He hoped soon to see the difference between the city rate and the improvement rate removed, and he thought outsiders would have reason to be satisfied with that arrangement.

Mr. RALPH suggested that instead of any possible deficiencies of instalment in the purchase-money being paid out of the city rates, they should be paid out of the income of the city, so that any profit upon other works belonging to the corporation might be taken into account for the benefit of the ratepayers.

METROPOLIS GAS SUPPLY.

TOO MUCH GAS FOR A JUDGE.—During the late term, the judges of the Court of Queen's Bench, sitting *in banco*, have made complaints as to the lighting of the court. On Tuesday, the 18th ult., their lordships, on entering the court, found the gaselier fully lighted, and Justice Blackburn complained that the glare affected his eyes, and directed that the gasman should be sent for. The usher speedily produced the gasman, who was informed by the learned judge that in case of further complaint arising he would be committed for contempt of court. The gasman stated that the excess of gas in the court arose from the demand for "more light" in the Divorce Court. He would, however, endeavour to regulate the light according to requirement in each court in future. Having received an admonition to do so, the penitent and somewhat scared gasman withdrew.

TOO LITTLE GAS FOR A STAGE MANAGER.—The *Standard* of the 17th ult. contained a letter of remonstrance by Mr. Chatterton, the manager of Drury Lane Theatre, respecting "the totally inadequate supply of gas furnished to public places of amusement by the London companies." In proof whereof the writer added that, "On Saturday evening last the performance at this theatre of 'Antony and Cleopatra' was seriously interfered with, and its scenic effects materially diminished, by the state of comparative darkness into which the main portions of the building were thrown by the failure of the usual supply. The cause, having been investigated by the gas engineer attached to the theatre, was found to be attributable to the defect in a valve connected with the meter, which could only be remedied by the officers of the company, who, upon being applied to for that purpose, replied that no assistance could be afforded until to-day." Of course, the conclusion of the whole matter was that the company had failed in their duty, and that the only alternative was an appeal to public opinion, from whence alone redress could be expected. There are two sides, however, to every story, and one side is always good until the other is heard. Mr. Phillips, the secretary of the Chartered Company, replying to Mr. Chatterton, says: "I am quite sure you have no desire to misrepresent the facts connected with your difficulty at Drury Lane Theatre on Saturday last, and I am disposed to think that you, personally, are in total ignorance of the circumstances which led to it. In the roadway outside the theatre is a valve, the property of the company, which your people have no right to touch. The object of this valve is to enable the company, on an alarm of fire or other emergency, to shut off the supply of gas from the building. The service-pipe on which this valve is placed is connected with the inlet of the meter, on the outlet of which another valve ought to be fixed by you to enable you to control the supply to the house at ordinary times, when the company's servants have no right to be there. Whether you have such a valve fixed we, of course, do not know, but as a matter of fact your fitter or gas engineer has always availed himself of the company's valve outside, until by constant use it has become disabled, and so he was unable to open it on Saturday evening. At such a time, although our men were in attendance, it was impossible to take out our valve for the purposes of examination and repair, or to replace it with a new one, without considerable risk, or within a period sufficiently short to have afforded you any relief; and even had it been practicable to remove the slide from the old valve, so as to give you a free supply from the main, the officers of the company would not have been justified in accepting the responsibility of leaving the whole of the supply-pipes within the theatre fully charged with gas from Saturday till Monday. The company's valve was renewed yesterday, but I am instructed to give you notice of the necessity for using your own valve, if it exists, or for having one fixed forthwith if it does not."

At the Metropolitan Board of Works, on Friday last, a letter was read from The Gaslight and Coke Company, inquiring whether the board would be disposed to agree with the company (as provided by the City of London Gas Act, 1868, section 70) to an increase in the price of gas, in order to meet the extraordinary expenses of the year 1874. Mr. Runtz moved—"That the communication be referred to the Works and General Purposes Committee for consideration and report." Mr. Leslie moved as an amendment—"That the letter be printed and circulated amongst the members of vestries and district boards, and taken into consideration at the next meeting of the board." This was a most important question, and he thought the public should know that, before the price of gas was increased, an official investigation was held. Mr. Newton thought it would be a breach of trust for the board to agree to the proposal; and Mr. D. Rogers said that, under the Act of Parliament, the Metropolitan Board of Works and the Corporation of London had power to take into consideration the raising of the price of gas by agreement with the company; but he thought no such change should take place until an official inquiry had been held. The amendment was lost, and the motion was carried; and it was also resolved that the letter should be printed and circulated amongst the members of vestries and district boards.

METROPOLIS WATER SUPPLY.

The following are the returns of the Association of Medical Officers of Health relating to the composition and quality of the metropolitan waters, in November, 1873:—

NAMES OF WATER COMPANIES.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	17·73	0·051	0·129	0·002	14·0	3·3
West Middlesex	17·63	0·038	0·164	0·001	14·0	3·3
Southwark and Vauxhall	19·84	0·074	0·126	0·002	15·0	3·8
Chelsea	17·53	0·098	0·107	0·002	14·0	3·3
Lambeth	19·81	0·086	0·128	0·002	15·0	3·8
Other Companies.						
Kent	28·31	0·006	0·216	0·000	21·8	5·6
New River	19·17	0·010	0·010	0·001	14·8	3·3
East London	19·13	0·029	0·116	0·002	14·5	4·0

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was more or less turbid—namely, in those of the Grand Junction, the Southwark and Vauxhall, the Chelsea, and the Lambeth Companies. The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Association of Medical Officers of Health, 115,326,807 gallons; and the number of houses supplied was 505,595. This is at the rate of 34·4 gallons per head of the population daily. The last official return from Paris stated that the average daily supply per head of the population was 24·9 gallons; but this includes the water used for the public fountains, and for the ornamental waters in the Bois de Vincennes and the Bois de Boulogne. HY. LETHEBY, M.B.

Major Bolton, in his report on the water supplied to the metropolis, states that during the month of October the state of the river at Hampton, Molesey, and Sunbury, where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, and East London Companies are situated, was very good from the 1st to the 12th, when it became slightly coloured and turbid, and remained more or less in this condition until the 28th, when it improved and became good for the remainder of the month. The highest flood state of the river at Hampton during the month was 5 inches above the (6 feet) summer level, and the lowest 3 inches below. At Ditton, the state of the water in the river during the month was good for 16 days, indifferent for 7 days, and bad for 8 days. The highest state of the flood water at this place was 1 foot 2 inches, and the lowest 1 inch above summer level. The highest temperature of the water during the month was 58°, and the lowest 44°, while the highest temperature of the air at the same place was 69°, and the lowest 36°. These observations were made daily at 9 a.m. The rainfall during the month was 2·70 inches.

"HOW MUST I MANAGE THE GAS?"—This is the title of another of those useful tractates for the correction of common errors in relation to artificial lighting and heating for which we are indebted to the pen of Mr. Rutter, of Brighton. This little treatise offers very excellent practical advice respecting gas-fittings, taps, burners, and glasses, as well as the management of the meter. There are also some wholesome suggestions upon the subject of the proper ventilation of apartments where gas is used, and the prevention of waste in burning. The author "tops up" with a few directions and cautions which might fitly have been headed "Golden Rules for Gas Consumers."

PETERBOROUGH GAS COMPANY.—The half-yearly meeting was held on the 18th ult. Mr. W. Harris presided. The accounts showed a balance of revenue for the half year ending September 30 of £294 17s. 9d. The balance of the profit and loss account, including the balance of the preceding half year, amounted to £1401 12s. 1d.; and the report recommended the payment of a dividend of £9 per cent. on the ordinary share capital, and £7 per cent. on the new ordinary share capital, leaving a balance of £217 4s. 8d. to be taken to the next half year's accounts. The directors recommended an increase of £2 2s. per annum to each of the auditors, making £7 7s. per annum each. The resolutions for payment of the dividends recommended, and for the increased salaries to the auditors, were unanimously carried, and the report and accounts were adopted.

EXPLOSION AT THE PRESTON GAS-WORKS.—On Friday, the 21st ult., about half-past five o'clock, an explosion occurred at these works. In the yard are some wells containing ammoniacal liquor, which are arched over and paved above, with apertures covered with iron plates. At the time above mentioned, one of the workmen, named Joseph Craven, removed the cover from one of the wells to ascertain the depth of liquor in it, and lowered a lighted candle into it for that purpose. Instantly there was a terrible explosion. Craven was blown some distance, the arches and mouth of the well were destroyed, and a considerable portion of the pavement of the yard was blown up. Craven sustained serious internal injuries, and lost the use of both legs. It appears that a gas-pipe which passes through the well had been leaking, and that the escaped gas mixed with that from the ammoniacal liquor.

FATAL ACCIDENT AT THE LONDON GAS-WORKS.—An inquest was held on the 20th ult., at St. Thomas's Hospital, on the body of Patrick M'Grath, aged 29, a coal porter at the London Gas-Works, Nine Elms, who died at St. Thomas's Hospital on the 15th. It appeared that on Saturday the deceased

and another man were working together on a stage at the works, about 30 feet from the ground, pushing a truck of coals, when the wheels got off the metals, and while deceased was endeavouring to replace the truck he overbalanced himself and fell to the ground. He was picked up insensible, and removed to the hospital, where it was found he had fractured his skull and jaw. He died from the injuries within two hours of admittance. A verdict of "Accidental death" was returned.

GAS LIGHTING AND SANITARY WORKS AT CONSTANTINOPLE.—The *Levant Herald* says good progress is being made with the gas-works in course of construction at Yedi-Koulé ("the Seven Towers"), with the gasometer, retorts, stoves, coal stores, and all other appliances, the masonwork being already completed. A recent Fraissinet steamer from Marseilles brought a quantity of necessary material for the works, as also posts, lamps, gas-jets, reflectors, &c. Gas-piping is being laid in the principal thoroughfares, and as soon as the orders now being executed at the celebrated Creuzot foundry in France are finished, all will be in readiness; so that, unless some unforeseen obstacle arise, there is every reason to believe that the Stamboul Gas-Works will be in operation and modern Byzantium lighted with gas by the end of the year. A project is also on foot, according to the same authority, for renewing the rejected proposals for bringing a water supply to Pera from Stranja. and for connecting the great flow from that source with the unfinished bend of Ihsaudéré, which the contractors would undertake to complete; and a new Sanitary Commission proposes to submit to the Government a deliberately considered plan for the purification of the city. At a recent meeting it decided upon recommending an immediate improvement of the sewers, and the construction of butchers slaughter-houses outside the town.

SUFFOCATION BY GAS AT EDINBURGH AND DUNDEE.—On Thursday afternoon last it was discovered that a fatal accident from an escape of gas had taken place in a house in Blackfriars Street, occupied by a tailor named M'Culloch. This man and his wife were last seen alive on Wednesday night about nine o'clock. As neither of them were met with on Thursday, suspicions were aroused that something had happened, and, on the door being broken open, M'Culloch was found dead, lying on a bed; while stretched beside him was his wife, apparently in the last stage of existence. The room was full of gas, and on examination it turned out that the gas-pipe by some means had become disconnected with the meter. There can be no doubt that the escaping gas had overpowered and suffocated M'Culloch, who was an old man about sixty-three years of age. Mrs. M'Culloch was immediately removed from the room, and medical aid was procured. By the application of a few restoratives she was brought round, and then taken to the Royal Infirmary, where she is progressing favourably.—On Friday morning a servant girl in the employ of Mr. Corner, East Newport, Dundee, was discovered in bed dead and quite cold, while the strong smell of gas which filled the room proclaimed at once what had been the cause of the unfortunate woman's death. It was found that although the light had been put out, the gas had not been turned off, and both door and window had remained closed.

ADVANCES IN THE PRICE OF GAS.—The Manchester Corporation Gas Committee met on Friday last, to consider, *inter alia*, the question of an advance in the price of gas. The Gas Audit Sub-committee, who had, at a meeting previously held, given the subject lengthy consideration, reported their decision to recommend an increase in the price from 3s. 4d. to 3s. 9d. per 1000 feet. The committee, after a long discussion on a proposal to increase the price by 3d. per 1000 feet in the city, and 6d. in the outlying districts, agreed that the advance should be 4d. in the city and 6d. in the outlying districts. It was also resolved that the price of gas per lamp in the outlying districts should be increased from 35s. to 42s. 6d.; and that within the city the price per lamp should be 35s., instead of 30s. as hitherto. The Corporation of Dumbarton have resolved to raise the price from 4s. 7d. to 6s., to commence on the 15th inst. At Accrington the price has been advanced from 4s. 6d. to 5s. to small consumers, and from 3s. 6d. to 4s. to large consumers. At Kilbarchan there has been a rise of from 6s. 5d. to 6s. 10d.; at Carluke, from 7s. 6d. to 8s. 4d.; at Lanark, from 6s. 8d. to 8s. 4d.; at Crawley the price has been increased to 7s. 6d., and at Whitchurch and Donnington there has been a rise of 10d. per 1000 cubic feet.

COAL CONSUMPTION IN GREAT BRITAIN.—In a recent address by Mr. J. Lowthian Bell, before the Iron and Steel Institute, the following statement was made regarding the modes of consumption of the coal raised. Every 1000 tons raised in the kingdom is disposed of as follows:—

In paper making and tanning	6
In smelting copper, lead, tin, and zinc	8
In water-works	14
In breweries and distilleries	18
In chemical manufactures	19
In railway work	26
In steam navigation	30
In articles of clay and glass, and lime-kilns	51
In textile fabrics, of wool, cotton, silk, flax, and jute	42
In gas-works	60
In mining operations	67
In coal exported to foreign countries	90
In general purposes, chiefly steam-engines	121
In domestic use	172
In iron and steel works, inclusive of that required for their steam power	300
	1000

We regard the estimate for gas-making as somewhat under the truth.

Register of New Patents.

314.—GIRDWOOD, R., Edinburgh, "*An improved portable apparatus for illuminating by means of gas.*" Patent dated Jan. 27, 1873.

This is an invention of an improved portable apparatus for illuminating by means of gas in circumstances wherein the ordinary portable gas lamps or stands are not so convenient as might be wished. The ordinary stands are made with bases often of considerable weight, for being set upon tables or other horizontal surfaces. The improved apparatus, however, which is comparatively light and convenient to handle, consists mainly of a short metal tube fitted with a burner, and having connected to it a pair of claws hinged together and pressed together by a strong spring, so as to act as a clip. With this arrangement the light can be fixed on any sufficiently narrow object, and in whatever position may be most convenient for illuminating an object, and will be of great utility in the dwelling-house, workshop, and other situations. It will enable a workman, or artist, to direct his light more conveniently than heretofore upon the work in hand; and will be applicable in many cases in which a stand requiring a horizontal surface for its support could not be used. Flexible tubing is used for supplying gas to the apparatus, as with ordinary gas apparatus, whilst as a precaution against accident the spring clip may be connected to a stop-cock on the burner tube, so that whenever the clip closes (from not being fixed on anything, or not being held open by the hand) the stop-cock will also close and shut off the gas.

331.—LATHAM, B., Westminster Chambers, Victoria Street, "*Improvements in purifying sewage and treating products obtained therefrom for the production of manure.*" Patent dated Jan. 28, 1873.

This invention consists in utilising the precipitate obtained from sewage in the "alumina," "phosphate of alumina," and other phosphatic processes, and the "magnesia" and "iron" processes for treating other sewage for the production of manure.

The precipitate is first dried, and, after standing some time, is treated with sulphuric or other acid, so as to convert the alumina in sulphate and sesquisulphate of alumina and the phosphates of alumina and lime into superphosphates, and also to carbonize some of the organic matter. This compound is then mixed with the sewage, together with sufficient alkali to neutralize the acid, whereupon the resulting alumina, phosphate of alumina, and phosphate of lime are precipitated, and, at the same time, the flocculent deposit formed drags down the suspended matters in the sewage, while the humus, mould, and carbonized matter of the compound combine with some of the ammonia. The deposit thus obtained may be used as a manure, or it may be dried and treated and be again applied to other sewage in the manner described, in order to obtain a rich manure. The solid matter may be first removed from the sewage by the apparatus described in patent No. 809 of 1869.

385.—BROEL, J., South Kensington, "*Improvements in apparatus for lighting and heating.*" Patent dated Jan. 31, 1873.

This invention relates to a peculiar combination and arrangement of apparatus for producing a mixture of air with the vapour of volatile hydrocarbons to be used as a gas for lighting and heating purposes, in connexion with which apparatus an automatic regulator is employed for regulating the production of such inflammable mixture in accordance with the rate of consumption.

In carrying out the invention, in one apparatus are combined a rotating generator, a set of bellows, or other air-forcing apparatus, a self-acting supply-reservoir, and an automatic gasholder and regulator; the rotary gas generator and the air-forcing apparatus being driven or caused to rotate by spring clockwork also combined with the apparatus, or by a weighted cord and barrel, or by any other suitable and convenient mode. The rotating generator is contained in a separate compartment, which is called the generating-chamber, and consists of a drum of double wirework or other reticulated material, having sponge, cotton wick, or other absorbent material packed in between the wirework of the drum. This drum revolves slowly in a volatile liquid hydrocarbon contained within the generating-chamber, the level of the liquid being always maintained at such a height as to reach to about the axis of the drum. It is preferable to make this drum buoyant, so that it shall float upon the liquid.

The level of the liquid is maintained constant or nearly so by the self-acting feed reservoir, which is situate above the generating-chamber, and is furnished with a supply-pipe which dips into the liquid in the generating-chamber. When the level of the liquid in the generating-chamber becomes too low, it unseals a vent-pipe which dips into the liquid and opens into the upper part of the supply-reservoir, whereupon a fresh supply passes from the feed reservoir into the generating-chamber. When the level has attained its proper height, the consequent closing or sealing of the vent-pipe prevents any further supply till it is again required. This supply-reservoir is to be filled by hand at suitable intervals, it being made of such a capacity as to contain, say, one month's consumption. An indicator or glass tube should be fitted to the reservoir to show the level of the liquid therein.

In a chamber by the side of the generating-chamber there is provided a set of bellows or other air-forcing apparatus, which, like the drum, are driven from the clockwork, but at a higher speed. These bellows force air through a tube or passage into the interior of the drain in the generating-chamber, so that it may permeate the absorbent material on the upper surface of the revolving drum, and become mixed with the vapour given off from the hydrocarbon contained in the porous or absorbent material. If a fan be used as the air-forcing apparatus, the air inlet to the fan chamber should be fitted with a valve opening inwards, so that no escape of inflammable air can take place through such aperture. The mixture of air and vapour thus obtained in the generating-chamber is expelled through a pipe or passage into the holder or regulating-chamber, which is made to expand and collapse according to the amount of inflammable air forced therein. This expansion and collapsing of the regulating-chamber may be accomplished in various ways. For example, it may be constructed somewhat similar to a weighted bellows, or the upper part of the chamber may consist of an open-mouthed inverted vessel, similar to the upper part of a gasometer, such vessel being sealed by working in any liquid which is not readily affected by frost; or a weighted flexible india-rubber diaphragm may be used, the object being to ensure the elevation of the upper part of the regulator as the supply of inflammable air increases. To the top of the regulator there is connected a lever, which, through the intervention of a connecting-rod and other levers, serves to stop or set in motion, as required, the motive power; so that the generation of the inflammable mixture of air and vapour may cease, or be diminished or increased, according to the rate of consumption, the supply-pipe or pipes being led off directly from the interior of the regulator itself.

389.—PLATT, G., Birmingham, "*A new improved mode of imparting ornamental effect to chandeliers, branches, and other ornamental gas-fittings, and which said improvements are also applicable to chandelier and general fittings, the means of illumination being otherwise than that of gas.*" Patent dated Feb. 1, 1873.

The novelty of this invention consists in the application of glass or other transparent or semi-transparent material placed between the scroll, filagree, or other open metal parts of chandeliers, branches, and other fittings adapted for illumination.

405.—JOHNSON, J. H., Lincoln's Inn Fields, "*Improvements in the treatment of essential oils, with a view to their employment as fuel for heating purposes.*" A communication. Patent dated Feb. 3, 1873.

This invention consists in solidifying essential oils, and more especially petroleum, with a view to their application as fuel to heating purposes, by bringing them in contact with solid porous bodies having the property of absorbing essential oils—such, for example, as wood, sawdust, pumice-stone, and more particularly coke. It is further proposed to combine essential oils (especially petroleum) with other inflammable substances which may also be used as fuel—for example, with oils of the same inflammable nature, in a solid or concrete form, white resin, colaphany, and such like substances, and to obtain a homogeneous mixture with petroleum oil for the purposes of heating.

409.—MEWBURN, J. C., Fleet Street, "*An improvement in cocks for water-meters and other like purposes.*" A communication. Provisional protection only obtained. Dated Feb. 4, 1873.

This specification describes the making of the rubbing or frictional parts of the plugs of cocks—viz., those parts which bear upon the seat, horizontal instead of conical or tapered, so as to prevent sticking or jamming.

430.—TAYLOR, J., gas manager, BUCKLEY, S., engineer, and CHADWICK, T. H., gas collector, all of Oldham, "*Improvements in machinery or apparatus for drawing and charging retorts used in the manufacture of illuminating gas.*" Patent dated Feb. 5, 1873.

This invention relates to an arrangement of machinery or apparatus whereby the retorts are drawn, and a fresh supply of coal or other such material is supplied. For these purposes a carriage is mounted upon rails extending along the line of retorts, and to facilitate its being traversed it is proposed to supply it with steam power and with suitable gearing. This carriage is furnished with a

projecting "jib," within which is a sliding box, the bottom being constituted by another part capable of an independent sliding motion, and provided with a rake which may be turned downward on a centre. When the apparatus is to be used, the jib and parts which it carries are run opposite to the open retort, and the sliding box having been supplied with coal, is thrust, together with its false bottom, into the retort; the rake is now turned downward, drawn forward so as to take with it the coke, while at the same time the false bottom is also drawn forward, and thus a fresh supply of coal is allowed to fall into the retort and occupy the place of the withdrawn coke. The above-mentioned operations are performed by suitable gearing driven by the motive power. In order to bring the jib and operating parts to the level of the retorts, they are mounted so as to slide upward and downward in the carriage by means of screws or other similar means. Instead of one rake there may be two or more acting simultaneously.

435.—HARRISON, C. W., High Holborn, Middlesex, "*Improvements in the treatment and use of air for the manufacture of gas for lighting and heating purposes, and in the apparatus employed therein.*" Provisional protection only obtained. Dated Feb. 5, 1873.

This specification describes a method of oxygenizing air by passing it under pressure or otherwise through water or any other suitable liquid that will absorb a larger proportion of the oxygen of the air than of the nitrogen. The air thus oxygenized is recovered from the water by a pump or other suitable means, and stored for use in a holder, whence it is conveyed by pipes to where required for use. It is then passed through a suitable hydrocarbon, and thus converted into inflammable gas or vapour adapted to lighting and heating purposes.

442.—DEAN, W., Bradford, and LANCASTER, R., Shelf, near Halifax, "*Improvements in gas-regulators.*" Patent dated Feb. 6, 1873.

This invention relates to a mechanical arrangement whereby the valve of a gas-regulator is brought with greater certainty to its seat, and also to an improved disc balloon or diaphragm for gas-regulators.

To carry out the invention, a guide or parallel motion is employed to prevent the balloon or diaphragm working sideways, by which the complete control of the gas is prevented and great loss of quicksilver ensues; this guide or parallel motion is made by a continuation of the valve-spindle working through a metal bush, on which is fitted a metal cap to prevent injury. The balloon or diaphragm of the present gas-regulators is very defective through its want of size and proportion; to obviate these defects, we make them much larger in proportion to their requirements; by means of the guide or parallel motion, and proportionate balloons or diaphragms, any required and regular pressure to the gas is given.

447.—BROWN, R., Edinburgh, "*Improvements in and connected with stop-valves or taps.*" Provisional protection only obtained. Dated Feb. 7, 1873.

This improved valve or tap comprises a body part and a connecting part. The connecting part, which is to be soldered or otherwise joined to the supply-pipe, is formed with a valve-seat, and is provided with a conical or disc valve, which opens against the pressure. The body part is made to screw into the mouth of the connecting part, or it may be attached by means of flanges and screws. In one modification of the body part it is made with a valve-seat, and is provided with a conical or disc valve opening against the pressure like that of the connecting part, and either of the valves is made with a projecting spindle, whereby the valve of the connecting part is pushed open by the valve of the body part when the latter is open. Any known construction of the body part and its valve may be adopted, provided the entering end is arranged to push open the valve in the connecting part.

450.—MAQUAY, W., Dublin, "*Improvements in the construction of furnace retorts, to be employed in connexion with other apparatus for the manufacture of gas.*" Patent dated Feb. 7, 1873.

This invention has for its object the construction and employment of furnace retorts in connexion with charging apparatus for conducting the manufacture and generation of gases on a continuous principle, by which the gas is at all times produced of uniform quality and with less manual labour and attention than at present, and consists in arranging the retort (in a rectangular form) horizontally above the furnace, so that the fire shall be enabled to act immediately upon the floor of the same, and raise it to a dull red heat as quickly as required. Within the retort is placed a rake, which is moved backwards or forwards as required by means of a handle or traversing bar passing through the front plate of the retort-chamber for the purpose of collecting the coke or other residue within the chamber, and discharging it into an enclosed well or other receptacle placed in the ground or beneath the floor of the retort until subsequently and finally removed. In connexion with this arrangement two or more charging tubes or cylinders are horizontally fitted to the top or crown of the retort, on the outside, each of which is mounted upon fixed bed-plates bored and slotted out longitudinally to receive the tubes or cylinders, having slot openings corresponding to the bearing plates, so that upon the cylinders or tubes being filled with the chemical substances to be employed, and turned round by a key or other instrument, the whole charge is at once passed through into the retort below without admitting the air or stopping the process; thus gases for chemical and other purposes can be readily obtained and supplied without intermission through the medium of intervening pipes or otherwise.

458.—LAFARGUE, A., Westbourne Park, "*Improvements in the production of gas or vapour from hydrocarbon oils or combinations thereof with other matters, and in means or apparatus employed in utilizing the same.*" Patent dated Feb. 7, 1873.

In effecting these improvements the steam from a steam-engine, or it may be other steam, is conducted into the lower part of a close vessel or generator containing petroleum or other hydrocarbon oil from which gas is to be generated, and which is kept supplied with such oil by pump or other suitable pressure (regulated by means of a gauge or indicator) from a reservoir or other source of supply. The steam is conveyed in coils of piping or in other layer or layers perforated to allow the steam to rise distributed amongst the oil in the generator, and in rising through the steam will take up and combine with vapour from the oil. This combined gas or vapour is thence conducted by suitable pipes (having a regulating valve or tap for use in heating or otherwise when lighted). It is found convenient to conduct the gas or vapour to a series of jets in the furnace of or under the boiler by which the steam is generated, or for other heating or it may be for lighting purposes. The pipe for conveying the gas generated for consumption is formed in coils or otherwise, to admit of a considerable surface being superheated in the furnace before it is allowed to escape and be lighted for heating purposes.

518.—RICHARDS, W., Brixton, "*Improvements in machinery and apparatus for charging and drawing retorts used in the manufacture of gas.*" Patent dated Feb. 12, 1873.

This invention consists in the erection of a quadrilateral frame upon a platform mounted on wheels, suitable for running along a tramway in front of the retorts, and is provided with boiler and engine for giving motion to the scoops, rakes, and other parts of the machine.

The essential features are the construction of a platform or platforms in combination with the machine for transporting and storing coals for charging. The employment of a chain, rope, or band passing round horizontal pulleys, and attached to each scoop for the purpose of propelling it into the retort and withdrawing it therefrom. The formation at the back end of the scoop of a lever groove and short quick screw, or its equivalent, working into a corresponding boss, whereby the scoop is reversed when it has entered the retort to a proper distance, and again righted on withdrawal. The application of the motion known as the "lazy tongs" to the rake for discharging the retorts. The arrangement of the stages upon which both the scoops and rakes may rest, together with the contrivance for raising or lowering the stages to the required elevation by means of quick threaded screws, with corresponding screw bosses, and having suitable reversing gear.

519.—RAMSDEN, J. C., Halifax, "*Improved means or method of and apparatus for transmitting heat from furnace or other dry heated gases to atmospheric air, or to other gases.*" Provisional protection only obtained. Dated Feb. 12, 1873.

This invention has for its object the utilization of the peculiar property possessed by "rock salt"—namely, its power of transmitting heat, which is employed or utilized for the purpose of transmitting heat from furnace or other heated gases to atmospheric air, and is accomplished by the introduction of a slab of rock salt between the heated gases and the atmospheric air, in connexion with mechanism and for different objects.

528.—HARRISON, C. W., High Holborn, Middlesex, "*Improvements in obtaining oxygen.*" Patent dated Feb. 12, 1873.

This is the invention of an apparatus for obtaining oxygen from atmospheric air, by passing the air into suitable porous substances, or by precipitating the oxygen of the air by magnetic or electro-magnetic action.

556.—ATKINS, F. H., Fleet Street, London, "*Improvements in apparatus and in the materials and appliances employed for the filtration of water, sewage, and other fluids, whereby manure and other valuable products are separated, precipitated and obtained therefrom.*" Patent dated Feb. 14, 1873.

This invention has for its object improved arrangements of apparatus and mechanism for the filtration of water, sewage, and other fluids, being specially adapted for the separation of the grosser impurities from water for manufacturing and other purposes, or for filtering the effluent water of sewage, the polluted water from paper or other manufacturing works to prevent the pollution of rivers, or for other purposes. It also relates to the preparation and application of coke in solidified blocks or slabs, for the filtration of water, sewage, or other fluids. The filtering materials in the form of blocks are secured in open removeable frames or slides. The frames are then placed and fixed in position across a watercourse, tank, passage, or channel, through which the water, sewage, or other fluid to be filtered is arranged to flow. Part of the series of frames may contain sponge, felt, or other filtering materials. When the filtering-slaps are coated with the impurities, they are removed and allowed to dry, and are cleansed by scraping, the scrapings being converted into manure.

According to another of these improvements, the grosser impurities are withdrawn from water, sewage, or other fluids, by means of endless bands of wire gauze, hair-cloth, canvas, sponge, or other suitable materials mounted upon rollers, and arranged so as to revolve in a tank or passage, through which the fluid to be filtered flows.

Another part of these improvements has for its object the application of galvanic, magnetic, or electrical action to filtering apparatus, reservoir, or tanks, for the purpose of precipitating organic and inorganic matters or impurities held in suspension or solution in the water or other liquids.

561.—ATTWATER, H. C., Horsham, Sussex, "*An improved supply and stop valve.*" Patent dated Feb. 15, 1873.

The principal feature of this invention is a combination of two valves, one to regulate the supply of water acted on by the lever of a floating ball, and the other held constantly open, except when the former is removed for repairs, when it closes.

565.—VINCENT, W., Newland, Hurst, Berks, "*Improvements in fuel for heating and illuminating purposes.*" Provisional protection only obtained Dated Feb. 15, 1873.

The inventor takes chalk or limestone, and dries, and afterwards mixes with, or steeps the same in, naphtha, paraffin, or other hydrocarbons, turpentines, or oils, and he afterwards dries the substances so treated, which can be done by placing it in sheds, and allowing the same to become gradually dried by the operation of the atmospheric air. When dried it is ready to be used for gas making or to be burnt for fuel.

576.—EMMENS, S. H., Old Jewry, London, "*Improvements in apparatus for producing heat and light.*" Patent dated Feb. 15, 1873.

The novelty of the invention relates to further improvements upon patent No. 2453, Aug. 16, 1872, and consists, first, in a further development of the heating portion of the patent, the novelty being (1) in passing a portion of the products of combustion escaping up the chimney into and through the fuel tank, by which they become impregnated with spirit and passed into the furnace; (2) in providing the entrances or front of furnaces with an air-tight apparatus having two compartments, one of which receives the air or other oxydizing agent, and the other the vapours from the fuel tank. From these chambers the gases pass together into the furnace where combustion takes place. Secondly, the novelty consists in providing portable or fixed lamps, with passages for air and vapour in one construction. The vapour is generated by heat, and conveyed to the burner, simultaneously with air; the two combining emit a brilliant flame. A second arrangement consists in impregnating the air with oil whilst being forced through a wick saturated with the oil; and, lastly, in constructing two passages for air to the burner, one of which conducts the air through a wick saturated with hydrocarbon spirit, and the other the air, which when mingling with each other combustion takes place, and a brilliant light ensues.

APPLICATIONS FOR LETTERS PATENT.

3628.—NUTTALL, P. D., St. Helen's, Lancs, "An improved arrangement of gas-box and reversing gear, applicable to Siemens's regenerative gas-furnaces." Nov. 7, 1873.
3632.—FRASER, A. C., New Barnet, Herts, and WATSON, W., Great Ayton, near Northallerton, Yorks, "Improvements in treating and utilizing sewage." Nov. 7, 1873.
3636.—DARLINGTON, F. A., St. Helen's Place, and SCOTT, F., Portland Place, London, "Improvements in machinery for charging and discharging gas-retorts." Nov. 8, 1873.
3639.—BOYKLL, R., Birmingham, "Improvements in apparatus for regulating and controlling the flow of liquids." Nov. 8, 1873.
3641.—PEACOCK, T., Wood Green, and PEACOCK, J. C., Finsbury Park Road, "Improvements in gas cooking apparatus." Nov. 8, 1873.
3663.—INGRAM, J. G., Hoxton, Middlesex, "Improvements in the manufacture of flexible metal piping and tubing." Nov. 11, 1873.
3666.—TOUSSAINT, J., Sparkbrook, Birmingham, "Improvements in the construction and arrangements of moulds or cores for casting iron tubes and pipes." Nov. 11, 1873.
3679.—SUTCLIFFE, H., and SUTCLIFFE, W., Halifax, "A new and improved safety syphon-valve tap and connexions for the same." Nov. 12, 1873.
3697.—BENSON, M., Southampton Buildings, London, "Improvements in the method of manufacturing gases for illuminating and heating purposes, and in the apparatus employed therefor." A communication. Nov. 13, 1873.
3699.—HOLMAN, S., Laurence Pountney Lane, London, "Improvements in direct-acting steam-pumps and pumping engines, and in condensers and governors therefor." Nov. 13, 1873.
3712.—TONGUE, J. G., Southampton Buildings, Chancery Lane, "Improvements in water or other fluid meters." A communication. Nov. 14, 1873.
3733.—FLETCHER, T., Warrington, "Improvements in gas-heating apparatus for laboratory use." Nov. 17, 1873.
3742.—SCOTT, H. Y. D., Ealing, Middlesex, "Improvements in the purification of sewage water." Nov. 18, 1873.
3762.—HUNTOON, H. P., Massachusetts, U.S.A., "Certain new and useful improvements on pipe-tongs." A communication. Nov. 19, 1873.
3781.—WHITE, W., Hampstead, "Improvements in the precipitation of sewage and other foul waters." Nov. 20, 1873.

GRANTS OF PROVISIONAL PROTECTION.

3419.—Lhotard, C. L., Paris, "Improvements in gas-burners with lateral and covered jets." July 19, 1873.

3426.—Medlen, R. W., Stoke Newington Green, "A new method for obtaining from petroleum, paraffin, or coal oil an improved quality of light for preventing smoke and smell, and for economizing the oil." Oct. 22, 1873.

3437.—Weems, W., Johnstone, N.B., "Improvements in apparatus or means for lighting and ventilating." Oct. 24, 1873.

3490.—Bray, H., Manchester, "Improvements in the manufacture of gas for illuminating and heating purposes." Oct. 27, 1873.

3528.—Bower, G., and Bower, A. S., St. Neots, "Improvements in rotatory steam-engines and in governors, which improvements are partly applicable to pumps and gas-exhausters." Oct. 30, 1873.

3541.—Milnes, J. F., Park Valley, Notts, "Improvements in apparatus for utilizing sewage." Oct. 31, 1873.

3549.—Rooke, A., Millwall, "Improved means of and apparatus for 'stopping' tubes." Oct. 31, 1873.

3554.—Sweet, A., Hampstead Road, "Improved mechanical arrangements for water supply purposes, whereby waste is prevented, regulation effected, and 'tremor' avoided." Nov. 1, 1873.

3555.—Gericke, K. L. H., Berlin, "Improvements in apparatus for regulating the flow of gas or other fluids." A communication. Nov. 1, 1873.

3568.—Rowley, J., Camberwell Road, Surrey, "Improvements in obtaining colouring matters and other substances from certain waste materials resulting from the manufacture of gas." Nov. 4, 1873.

3610.—Gurney, J., Bradford, Yorks, "Improvements in the construction of taps or valves." Nov. 6, 1873.

3622.—Melling, J. W., Wigan, "Improvements in safety and relief valves." Nov. 6, 1873.

NOTICES TO PROCEED.

2453.—Somerville, J., gas engineer, Dublin, and Robinson, J., West Bromwich, "Improvements in apparatus for discharging gas-retorts." July 16, 1873.

2482.—Kab, D. C., St. Denis, France, "Improvements in the mode of utilizing the products of distillation of combustible, vegetable, and animal matters in the production of gas." July 19, 1873.

2747.—Turner, R., and Rollason, G. R., Birmingham, "An improved arrangement for counteracting the weight of pendant sliding chandeliers." Aug. 20, 1873.

3227.—Ritchie, C., Brixton, Surrey, "Improvements in apparatus for utilizing heat for heating, cooking, ventilating, and lighting." Oct. 4, 1873.

3291.—Silber, A. M., Whitecross Street, and Farquhar, J. F. C., Long Acre, "Improvements in the construction of lamps and lanterns or similar apparatus used for lighting purposes, and in apparatus for heating purposes." Oct. 10, 1873.

3327.—Surmon, H. J., Belvedere, Kent, "Improvements in apparatus for manufacturing gas." Oct. 14, 1873.

3411.—Seegers, L., Berners Street, Oxford Street, "Improvements in the construction and arrangement of apparatus for economizing the consumption and increasing the illuminating and heating powers of coal gas water gas, and other inflammable vapours and gases, and mixtures thereof." Oct. 23, 1873.

3487.—Haseltine, G., Southampton Buildings, London, "An improved motive-power engine to be operated by the pressure of water, steam, or compressed air, and capable of use as a pump, blowing-engine, or gas-exhauster." A communication. Oct. 27, 1873.

3490.—Bray, H., Manchester, "Improvements in the manufacture of gas for illuminating and heating purposes." Oct. 27, 1873.

3528.—Bower, G., and Bower, A. S., St. Neots, "Improvements in rotatory steam-engines and in governors, which improvements are partly applicable to pumps and gas-exhausters." Oct. 30, 1873.

3573.—Smith, E., Glasgow, "Improvements in removing sulphur from caustic soda or ammonia when containing sulphides." Nov. 3, 1873.

3610.—Gurney, J., Bradford, "Improvements in the construction of taps or valves." Nov. 6, 1873.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

957.—Robey, J., Manchester, and Chantrell, G. F., Liverpool, "A new or improved filtering and deodorizing medium." March 15, 1873.

1392.—Faulkner, J. H., Brixton, Surrey, and Tatters, W., Battersea, "Improvements in measuring or meter-taps and valves." April 17, 1873.

1404.—Harvie, W., Glasgow, "An improvement in lamps." April 18, 1873.

1415.—Newton, A. V., Chancery Lane, "Improvements in the mode of and apparatus for manufacturing metal tubing." A communication. April 18, 1873.

1504.—West, J., Maidstone, "Improvements in apparatus used in the purification of gas." April 25, 1873.

1524.—Webster, G. M., Aston-juxta-Birmingham, "An improved stove for heating and cooking purposes." April 26, 1873.

1552.—Nolden, M., Frankfort-on-the-Maine, "An improved method of and apparatus for cleansing water from impurities." April 29, 1873.

1579.—Davies, P. J., Hornsey, Middlesex, "Improvements in apparatus for controlling, regulating, measuring, and arresting the flow or discharge of fluids, or liquids, and preventing waste thereof." May 2, 1873.

1660.—Wotherspoon, J., Glasgow, "Improvements in the manufacture of asbestos packing for pipe-joints and other similar purposes." May 3, 1873.

1637.—De Castro, D., Mortlake, Surrey, and Burton, R., Camden Town, Middlesex, "Improvements in gas-meters." May 6, 1873.

1676.—Ronald, B., and Farmer, J., Glasgow, "Improvements in water-closets, parts of which are applicable to other water cisterns." May 9, 1873.

1697.—Haseltine, G., Southampton Buildings, London, "An improved method of and apparatus for lighting and extinguishing gas-burners." A communication. May 10, 1873.

1713.—Clark, A. M., Chancery Lane, "Improved apparatus for lighting lamps and similar purposes." A communication. May 10, 1873.

1752.—Potel, A. P., Brussels, "Improved joints for water, gas, and other pipes." May 14, 1873.

1794.—Bousfield, G. T., Sutton, Surrey, "Improvements in motive-power engines to be worked by steam or other fluid, applicable also to meters and pumps." A communication. May 16, 1873.

1807.—Telling, W. A., and Johnson, S., Wood Green, Middlesex, "Improvements in gas-meters." May 19, 1873.

1853.—Orsat, L. H., Paris, "An improved apparatus for analyzing gas." May 22, 1873.

2006.—Siemens, C. W., Great George Street, Westminster, "Improvements in apparatus for producing and regulating electric currents, such apparatus being particularly applicable for electric lighting." A communication. June 5, 1873.

2152.—M'Avoy, H. L., Baltimore, U.S.A., "Improvements in apparatus for carburetting air for illuminating or heating purposes." June 19, 1873.

2281.—Chapman, L., Connecticut, U.S.A., "Improvements in rotary pumps." July 1, 1873.

2517.—Marsden, J., and Collins, J., Bolton, "Improvements in the treatment of sewage water, and in the manufacture of manure." July 4, 1873.

2427.—Silber, A. M., Wood Street, "Improvements in the construction of burners for the combustion of gas." July 14, 1873.

2471.—Muller, J. A., Amsterdam, Holland, "Improvements in apparatus for measuring and registering the flow of water and other liquids." July 17, 1873.

2532.—White, W., Hampstead, "Improvements in the treatment of sewage water." July 24, 1873.

2673.—Wahab, C. J., Penicuick, N.B., "Improvements in filters." Aug. 12, 1873.

2713.—Robinson, A. H., Dublin, "Improvements in water-meters." Aug. 15, 1873.

2834.—Maitland, W. H., St. Swithin's Lane, London, "Improvements in the manufacture of gas, and in apparatus employed therein." A communication. Aug. 28, 1873.

2901.—Yarrow, E. H., Camberwell Park, Surrey, "Improvements in the manufactuer of gas for lighting and heating purposes, and in furnaces and apparatus for the same." A communication. Sept. 3, 1873.

2905.—Haseltine, G., Southampton Buildings, London, "An improved method of and means for cleaning surface condensers." A communication. Sept. 3, 1873.

2936.—Bois, L., Paris, "Improvements in the manufacture of lighting gas, and in apparatus employed therein." Sept. 6, 1873.

2994.—Clark, A. M., Chancery Lane, "Improvements in screw-valves." A communication. Sept. 11, 1873.

3011.—Richardson, G. W., New York, "Improvements in means or apparatus for ventilating and pumping purposes." Sept. 13, 1873.

3101.—Mewburn, J. C., Fleet Street, London, "Improvements in lighting railway carriages with gas, and in the apparatus employed therein." A communication. Sept. 22, 1873.

3173.—Everett, G. A., New York, "Improvements in pressure-gauges." Sept. 30, 1873.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2752.—George, G., "Improvements in numerical registering and indicating apparatus." Oct. 19, 1870.

2784.—Fletcher, W., "Improvements in apparatus for measuring liquids." Oct. 22, 1870.

2903.—Breeden, J., "Improvements in self-closing taps or valves." Nov. 3, 1870.

2915.—Somerville, J., "Improvements in pipes, and in the means of connecting them together." Nov. 4, 1870.

2935.—Newton, W. E., "An improved metallic composition for pipes and other purposes." Nov. 7, 1870.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

2672.—Smith, J., and Rowe, J. J., "Improvements in taps or cocks for regulating the flow of fluids." Oct. 16, 1866.

2679.—Bronner, J., "Improved fixing of draught apparatuses and their respective supports on all kinds of gas-burners, and improved gas-burners and draught apparatuses in connexion with that." Oct. 17, 1866.

2736.—Phillips, H., "Improvements in the preparation of deodorizing materials, and in the manufacture of gas." Oct. 25, 1866.

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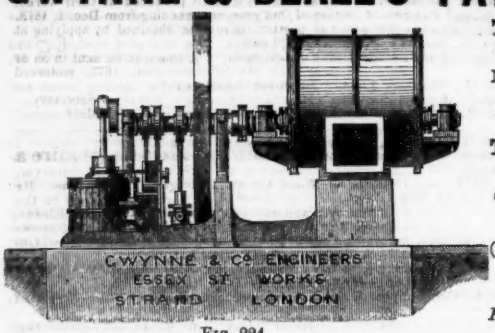

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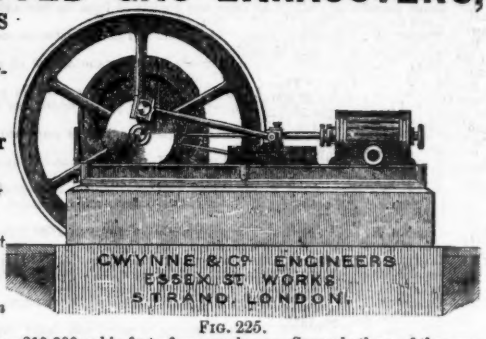

FIG. 225.

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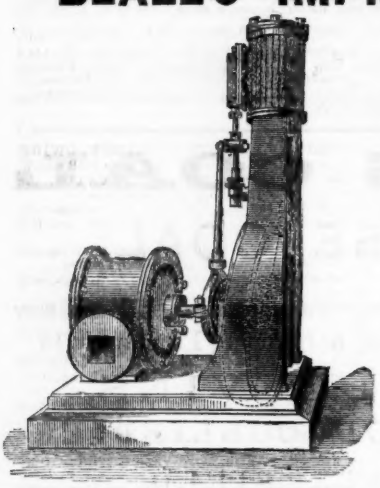

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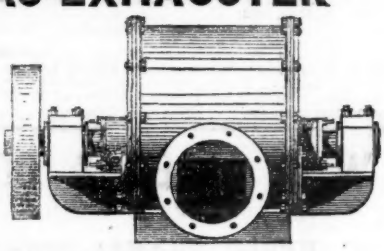

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Orders of any magnitude, for home and exportation, executed with all possible despatch.

N.B.—A quantity of Retorts in stock. Circulars, 15 in. and 16 in. Ovals, 20 in. by 14 in. D's, 15 in. by 13 in.; 16 in. by 12 in.; 18 in. by 14 in.; 20 in. by 16 in.; 21 in. by 14 in.; and 24 in. by 14 in.

THE IMPERIAL CONTINENTAL GAS ASSOCIATION.

The HALF-YEARLY ORDINARY MEETING of the Imperial Continental Gas Association was held at the City Terminus Hotel, Cannon Street, on TUESDAY, the 25th inst.,—Philip Twells, Esq., the Chairman—when the following Resolutions were passed:—

Resolved unanimously—"That the report upon the affairs of the Association now read be received, adopted, and entered on the minutes."

Resolved unanimously—"That a dividend of £1 15s. per share be declared upon the 56,000 shares of the Association for the half year ended the 30th of June last, and that the said dividend be payable, free of income-tax, on and after the 15th of December next."

"That the cordial thanks of the meeting be given to the President and Directors for their able management of the affairs of the Association, and to the Chairman for his conduct in the chair this day."

Upon the motion of the Chairman, Mr. Philip Twells, a vote of thanks was also given to Mr. G. W. Drory, the General Superintendent of the affairs of the Association on the Continent, and to the Agents, Engineers, and other officers acting under him.

By order of the Board of Direction,
ALBERT F. JACKSON, Secretary.

30, Clement's Lane, Lombard Street,
London, Nov. 26, 1873.

ON SALE, cheap, and in capital condition, One cast-iron SCRUBBER, 17 ft. high by 4½ ft. diameter.

One vertical CONDENSER, with seven double rows of 8-in. pipes 20 ft. high.

Apply to Mr. LONGWORTH, Dukinfield, MANCHESTER.

RICHARD THOMAS & CO.,
40, GRACECHURCH STREET,
Manufacturers of
EWELL FIRE-BRICKS, CLAY, AND CEMENT.
Warranted the best quality.
WORKS AT EPSOM.

HOPKINS, GILKES, & CO.,
LIMITED,
MIDDLESBOROUGH,
SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
CAST-IRON RETORTS.
Castings for Gas-Works of every description.
EXHAUSTERS.
LONDON OFFICE: 25, LAURENCE POUNTNEY LANE.

TO GAS COMPANIES, ENGINEERS, CONTRACTORS, AND OTHERS.

GEORGE NEWTON,
UNION STREET WEST, OLDHAM,
BRASS FOUNDER AND FINISHER,
MANUFACTURER OF
IMPROVED WET AND DRY CONSUMERS GAS-METERS,
LAMP METERS AND BOXES,
GOVERNORS, GAUGES, INDICATORS, EXHAUST & PRESSURE REGISTERS,
GAS STATION-METERS,
With all the joints planed.
TERMS, &c., ON APPLICATION.

THE THAMES BANK IRON COMPANY,
(Successors to LYNCH WHITE,)
SUPPLY FROM STOCK
CAST-IRON RETORTS, SOCKET-PIPES for GAS or WATER PURPOSES, FLANGE-PIPES for STEAM, RAIN-WATER PIPES and GUTTERS, HOT-WATER PIPES and BOILERS, and all requisite Connexions for same; also LAMP-COLUMNS, LAMPS, WROUGHT FRAMES, WROUGHT-IRON TUBING, &c., &c.
All kinds of Gas-Works Apparatus and General Castings made to Pattern or Drawing.
ADDRESS—
OLD BARGE WHARF, UPPER GROUND STREET, LONDON, S.E.

SCHOLL'S
PATENT PLATINUM
GASLIGHT PERFECTER.

Extract from Report by Dr. Letheby:—

"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

Extract from Dr. Frankland's Course of Lectures at the Royal School of Mines, February, 1868.

"Scholl's Platinum Perfecter is one of the most important inventions of modern times in connexion with the burning of coal gas."

Price 1s. each for Fishtail Burners.

To be had retail of Gas-Fitters and Ironmongers.

JOHN SCHOLL, Manufactory: 41 & 42, BERWICK STREET;
Retail Depot: 198a, OXFORD STREET, LONDON, W.

Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.

. Further testimonials from Drs. Frankland and Crooks, showing the great practical value of this invention, will be shortly published.

GEORGE ANDERSON,
GAS AND CONSULTING ENGINEER,
19, NORTHUMBERLAND STREET, STRAND, W.C.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.
BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

SULPHATE OF AMMONIA.

THE Directors of the Devonport Gas and Coke Company are prepared to receive TENDERS for the SULPHATE of AMMONIA produced at their works, for the period of One year, commencing from Dec. 1, 1873.

Samples and particulars may be obtained by applying at the Offices on the Works.

Tenders, addressed to the Chairman, to be sent in on or before Monday, the 8th of December, 1873, endorsed "Tenders for Sulphate of Ammonia."

JOHN WILLING, Secretary.
Devonport Gas and Coke Company, Nov. 25, 1873.

THE Local Board of Malvern require a competent person to fulfil the office of Surveyor, Inspector of Nuisances, and Manager of Gas-Works. He will be required to devote the whole of his time to the duties of his office, and not engage in any other business. He will be expected to have a thorough practical knowledge of all the duties of a Surveyor under the Local Government and Public Health and Sanitary Acts, and to be practically acquainted with the making of Gas and management of Gas-Works.

The population of the district is about 5700; length of highways about 15 miles.

Salary £200 per annum, with an unfurnished house, gas, and coal. The Board provide an Assistant, and also a Sub-Inspector of Nuisances.

Application, with testimonials, to be addressed to the CLERK of the MALVERN LOCAL BOARD, on or before the 9th day of December next, at Eleven o'clock in the forenoon.

Local Board Offices, Great Malvern,
Nov. 10, 1873.

THE CHURCH STRETTON GASLIGHT AND COKE COMPANY, LIMITED (IN LIQUIDATION).

TO BE SOLD, by Tender, in One Lot, all that the freehold site, beneficial and other interest of the Company, of and in all those the GAS-WORKS for the Market Town of Church Stretton, in the county of Salop, and its neighbourhood, with the Retorts and Purifying-Houses, Manager's Dwelling, Gasholder Tank and Yards, and also the Plant and Apparatus (modern and improved), double-lift Gasholder, Street, Road, and other Mains, Services, Public Lamps, Iron Pillars, Brackets, Meters (in use and in stock), Tools, Implements, and Chattels belonging thereto.

The whole will be sold as a going concern as now worked.

The retorts now in use are new, and the apparatus for the manufacture and purification of gas was renewed, on the most improved principle, in the early part of 1871.

The premises are supplied (on certain conditions, and payment of 10s. annually) with a never-failing supply of good water at high pressure.

Church Stretton is a small thriving town on the Shrewsbury and Hereford Railway, 13 miles south of Shrewsbury, and about 6 north of Craven Arms.

The villages of All Stretton and Little Stretton are within easy distance for the extension of the Company's mains, and applications have been made for a supply of gas to All Stretton.

The Liquidators will receive sealed tenders, endorsed "Tenders for the Church Stretton Gas-Works," up to Twelve o'clock at noon, on Friday, the 12th day of December next, at which time the tenders will be opened at the residence of Mr. Hyslop, in Church Stretton.

The Liquidators do not bind themselves to accept the highest or any tender.

Orders to inspect, with schedule and conditions of sale, can be obtained from either of the Liquidators, WILLIAM HYSLOP, Esq., Church Stretton, Mr. JAMES BUNKLE, Public Accountant, 25, Waterloo Street, Birmingham, or from S. HARLEY ROUSE, Solicitor, Swan Hill, Shrewsbury, and Church Stretton.

THE Scarborough Gas Company, owing to the removal of their works, will have FOR SALE, about October, 1874, the following APPARATUS, the whole of which is in exceedingly good condition:—

Fittings for 140 Retorts, consisting of mouthpieces, ascension, saddle, and dip pipes, and hydraulic and foul mains.

A Condenser, consisting of 40 12-in. pipes, with top and bottom boxes, and inlet, outlet, and bye-pass valves.

Two Scrubbers, each 7 ft. diameter and 16 ft. high, with valves as before.

Two Purifiers, 8 ft. 6 in. square and 5 ft. deep, 20-in. water lutes.

Two Cast-iron Water-Tanks, respectively 24 ft. by 16 ft. by 4 ft., and 20 ft. by 8 ft. by 4 ft. New in 1865.

Two Horizontal Engines, 4 h. p., two single-flue Cornish boilers, and two 20,000 feet per hour Beale's Exhausters. All new in 1866.

One Station-Meter, by Milne, 20,000 feet per hour. New in 1864.

One Gasholder 80 ft. diameter, in two 24-ft. lifts. About 11 years old.

One Gasholder 50 ft. diameter, in two 22-ft. lifts. Only 4 years old.

Two Governors, by Parkinson, on 12-in. and 10-in. mains.

A considerable length of 10-in. Cast-iron Socket and other Pipes.

An inspection of the above Apparatus is requested by the Officers of Companies requiring enlargements or extensions, and offers to purchase will be duly considered.

By order of the Board,
JAMES MOON,
Manager and Secretary to the Company.

Now ready, price 1s. 6d., post free,

THE GAS CONSUMER'S MANUAL;
OR,
How to obtain Good Light and Cheap Gas.

Being a Popular Exposition of the Chemistry of Gas Lighting, with Practical Instructions in the best methods of burning Gas for Lighting, Cooking, and Heating; and Suggestions as to the proper Sizes of Interior Pipes, Arrangement of Lights, &c., &c.

ILLUSTRATED.

Also, price 2s. 6d., post free,

ON SETTING AND WORKING RETORTS.

A Revised and Illustrated Reprint of a Paper read at the Annual Meeting of the British Association of Gas Managers in 1870.

By E. S. CATHELS, Assoc.Inst.C.E., Montreal, Canada.
London:
WILLIAM B. KING, 11, Bolt Court, Fleet Street, E.C.

GAS PURIFICATION.

JOHN WM. O'NEILL AND CO.,

CONTRACTORS FOR

GAS PURIFICATION BY OXIDE OF IRON,

39, LOMBARD STREET, LONDON, E.C.

WHITEHOUSE AND COMPANY, LIMITED,

GLOBE TUBE-WORKS, WEDNESBURY; & VICTORIA TUBE-WORKS, GREAT BRIDGE, STAFFORDSHIRE,

MANUFACTURERS OF

PATENT WELDED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

GAS-FITTERS TOOLS, STEAM COCKS, AND ALL KINDS OF JOINTS.

HYDRAULIC TUBES, CORE BARS, TELEGRAPH POSTS, COILS, &c.

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VICKARYS AND ROBERTSON,

Late JOHN VICKARY,

ESTABLISHED 1840,

GAS ENGINEERS, CONTRACTORS, IRON AND BRASS FOUNDERS,

WEST OF ENGLAND ENGINEERING WORKS, EXETER.

GASHOLDERS AND TANKS,

Retorts, Retort-Fittings, Condensers, Scrubbers, Purifiers, Station-Meters, Governors, Rack and Screw Valves. Gas and Water Mains always in Stock.

STEAM-ENGINES, EXHAUSTERS, SHAFTING AND GEARING, &c.

GAS-FITTINGS,

Including Chandeliers, Pendants, Hall Lamps, Brackets, Star and Sun Lights of all designs.

WET & DRY GAS-METERS,

Combining most recent improvements in principle and manufacture; upwards of 200,000 already in work, giving highest satisfaction. (A guarantee of five years given with every Meter.)

PLUMBERS WORK, including Lift and Force Pumps; Cocks for Gas and Water and Steam; Brass Fittings.

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LONDON OFFICE: 8, JOHN STREET, ADELPHI, W.C.

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CONSUMERS WET METERS,

IMPROVED DRY METERS, STATION-METERS, GOVERNORS,

PATENT LAMP-REGULATORS,

EXPERIMENTING METERS, PRESSURE-GAUGES, &c.

JUST PUBLISHED, a revised and illustrated Reprint, with additions, of the Paper on

RETORT SETTING AND WORKING,

READ AT THE

MEETING OF THE BRITISH ASSOCIATION OF GAS MANAGERS IN 1870,

By E. S. CATHELS, Assoc. Inst. C.E.

To be had of Mr. W. B. KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

Price 2s. 6d., post free.

"The first paper read was on the 'Setting and Working of Retorts,' by Mr. E. S. Cathels, of the Crystal Palace District Gas-Works. This was an exhaustive, and, to gas managers, an invaluable paper on the apparatus used in one of the most important processes in the manufacture of gas. It is a subject to which the author is well known to have given special attention, and we therefore commend his paper to the careful notice of those of our readers who are interested in the production of gas."—*From a Leading Article in "Engineering," on June* 10, 1870.

RETORT-SETTINGS.

MR. CATHELS

IS PREPARED TO SUPPLY

TRACINGS OF DETAILED WORKING DRAWINGS

OF HIS

IMPROVED RETORT-SETTINGS

(FROM 1 TO 9 RETORTS IN A BED),

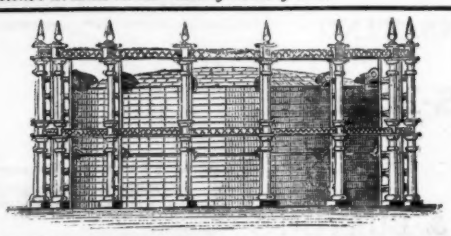
ADAPTED FOR EITHER COKE OR TAR AS FUEL,

Showing Plans, Transverse and Longitudinal Sections, and Elevations; easily understood by any retort-setter or bricklayer. These Settings are excellent gas producers, with great economy in fuel.

For terms, &c., apply to E. S. CATHELS, Assoc. Inst. C.E., GAS-WORKS, MONTREAL, CANADA.

"On the proper mode of setting the retorts the prosperity of a gaslight establishment mainly depends."—*Vide Peckstone's Treatise on the "Manufacture of Gas."*

HOPE IRON WORKS,



STOCKTON ON TEES.

ASHMORE & WHILE,

GAS ENGINEERS & CONTRACTORS,

MANUFACTURERS OF GASHOLDERS,

GAS APPARATUS OF EVERY DESCRIPTION,

Including Improved

Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,

And GENERAL IRONWORK.

N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

SAM. CUTLER & SONS,

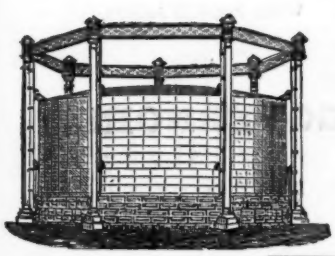
CONTRACTING GAS ENGINEERS,

GASHOLDER & GENERAL GAS APPARATUS MAKERS,

MANUFACTURERS OF

BOILERS, IRON ROOFING, IRON BRIDGES,

AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works**, for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs**, and every description of **Apparatus** for the Manufacture and Distribution of Gas.

Special attention is invited to their **"Improved Condenser,"** which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers,** and **Purifiers,** of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves.**

WORKS FOR THE SUPPLY OF

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S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water,** and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

Address: PROVIDENCE IRON-WORKS, MILLWALL, LONDON.

SAMUEL PONTIFEX, Consulting Gas Engineer, having retired from the Great Central Gas Company, is now prepared to furnish PLANS and SPECIFICATIONS, as well as ADVISE Provincial Gas Companies as to the erection of new, or alteration and enlargement of existing works.

Offices: 22, Coleman Street, LONDON, E.C.

MR. WILLIAM DORE (19 years Gas Engineer and Accountant) may be CONSULTED upon all matters relating to the manufacture and distribution of gas, and the management, accounts, or transfer of gas undertakings.

Office, 4, Pieton Place, Neath, SOUTH WALES.

MR. NORWOOD EARLE, late of the Dover Gas-Works, is prepared, after 17 years experience, to undertake the duties of SURVEYOR to Gas Companies and Corporations in all matters relating to the Distribution of Gas and Gas Testing. Contracts entered into for the Survey of Mains, Services, Public Lamps, &c., in order to reduce the per centage of unaccounted-for gas to the lowest possible amount.

Valuations for Assessment, Transfer, and other purposes.

Offices, MANSION HOUSE CHAMBERS, 12, Queen Victoria Street, LONDON, E.C.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

ADDISON POTTER,

WILLINGTON QUAY,

NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of Clay Retorts, Fire-Bricks and every description of Fire-Clay Goods.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HORSLEY, Agent.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

TO GAS COMPANIES.

GEORGE McKAIG,

MANUFACTURER OF

GAS-PURIFYING WOOD SIEVES

153, CLEVELAND STREET,

DONCASTER.

It requires but one trial to prove the Superior Make, Strength, and Durability of these Sieves.

FIRE-CLAY RETORTS.

WILLIAM FRASER,

INVERKEITHING,

(Owner of the Works at which Fire-Clay Retorts were first made), can supply

RETORTS, FIRE-BRICKS, &c.,

to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

He ships at Charlestown his

CELEBRATED HALBEATH STEAM COALS,

on Navy List.

B. CARPENTER'S

IMPROVED WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

WORKS:

22, HERMES STREET, PENTONVILLE ROAD,

LONDON, N.

The above Sieves are used by all the Gas Companies in London and a great many in the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

THE IMPERIAL METER COMPANY, LIMITED,

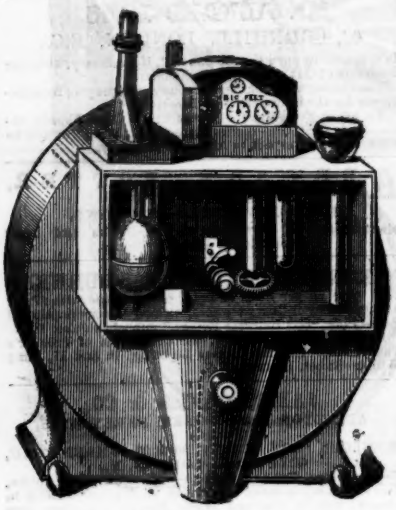
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

IMPERIAL

COMPENSATING

WET GAS-METER.

DE CASTRO & BURTON'S

PATENT.

Back View.

I. **This Meter is more simple in construction than the common non-compensating Meter.**
II. **An unvarying water-line is maintained.**
III. **No amount or kind of pressure will cause it to "flood."**
IV. **It is practically unaffected by "tilting."**
V. **The friction is less than in any other Meter; and**
VI. **It will last for twelve months without requiring to be refilled.**

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE COMMON NON-COMPENSATING WET GAS-METERS OF ALL SIZES, BOTH IN TIN AND CAST-IRON CASES.

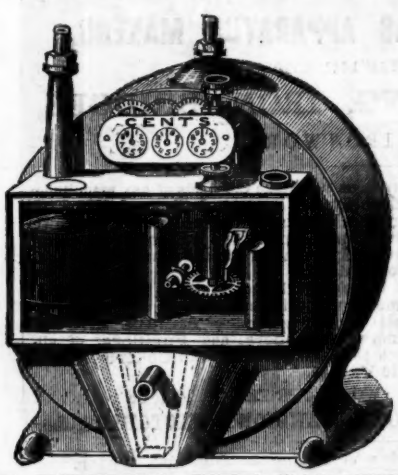
THE COMPENSATING

WET GAS-METER

IS UPHELD FOR

TEN YEARS

WITHOUT CHARGE.



THE IMPERIAL WET GAS-METER.
Non-Compensator.

STATION-METERS

WITH PLANED JOINTS,

AND

GOVERNORS,

MADE TO ORDER

Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

THE IMPERIAL METER COMPANY, LIMITED,

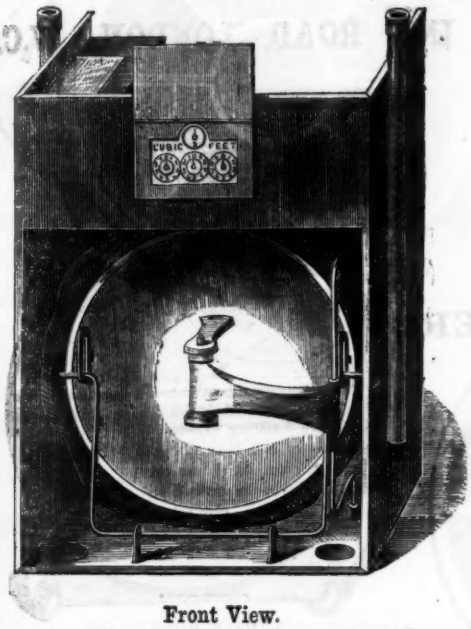
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

IMPERIAL

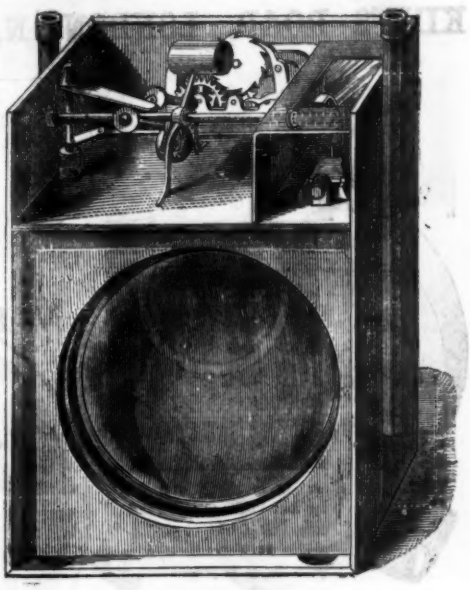
DRY

GAS-METER

SINGLE DIAPHRAGM.

TELLING & JOHNSON'S

PATENT.



Back View.

I. The mechanical construction of this Meter is simpler and stronger than any other.
II. About half as much leather is used as in ordinary dry Meters.
III. The Meter has only one valve, and this cannot "stick."
IV. The lights maintain perfect steadiness and strength of flame. There is no "draw."
V. The gas consumed can only be measured from the inlet to the outlet, and
VI. The index cannot be made to register backwards.

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE ORDINARY DOUBLE DIAPHRAGM DRY GAS-METERS OF ALL SIZES, BOTH IN TIN AND IN CAST-IRON CASES.

SPECIAL ATTENTION

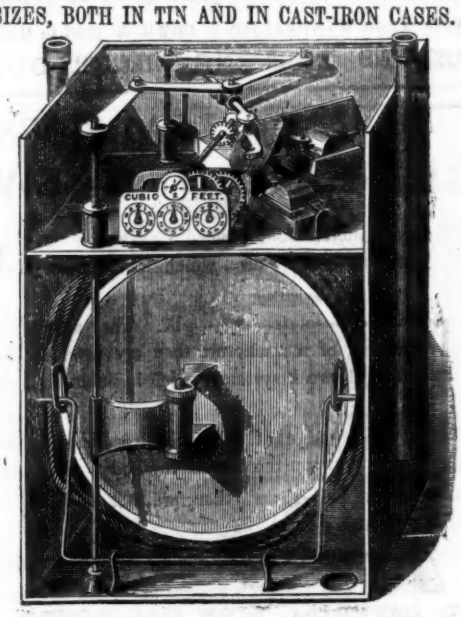
IS PAID TO THE

MANUFACTURE OF

STREET-LAMPS

AND

REGULATORS.



EVERY

DRY GAS-METER

IS UPHELD FOR

SIX YEARS

WITHOUT CHARGE.

THE IMPERIAL DRY GAS-METER.

Double Diaphragm.

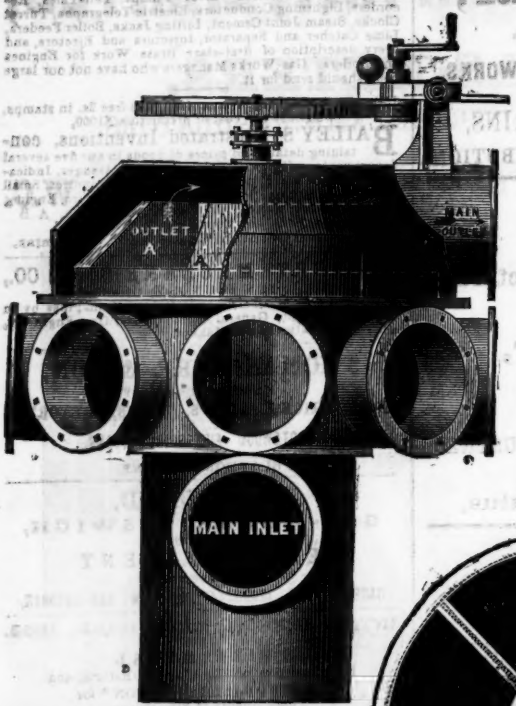
Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

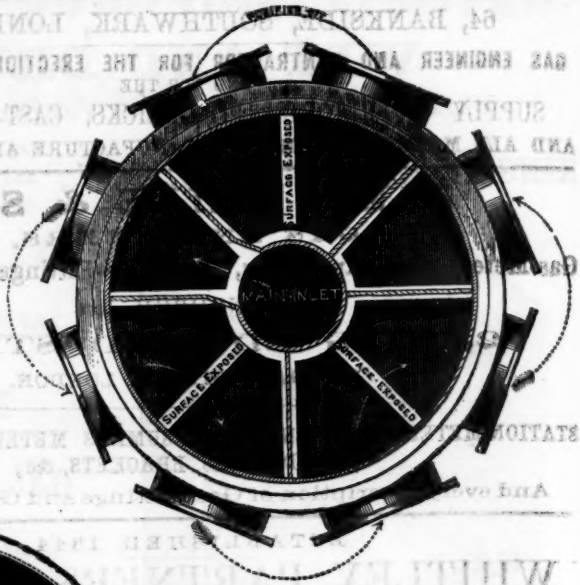
W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

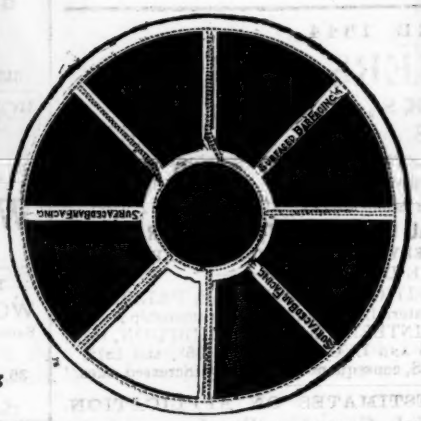
C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.



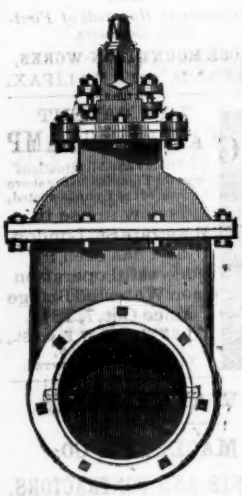
Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)



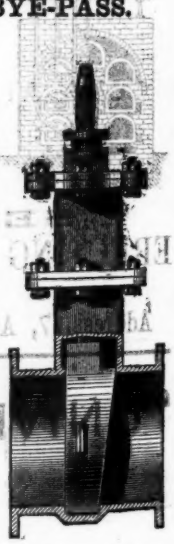
Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVES FORMING INLET, OUTLET, AND BYE-PASS.



C. & W. WALKERS'
DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves are superseding the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

GASHOLDERS, TELESCOPE & SINGLE-LIFT, of LARGEST DIMENSIONS.

PURIFIERS, SCRUBBERS, CONDENSERS of most Improved Description.

WOOD SIEVES FOR PURIFIERS,

Which have now been in use for more than ten years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

ALFRED WILLIAMS,
PHŒNIX FIRE-BRICK WHARF,
64, BANKSIDE, SOUTHWARK, LONDON, S.E.

GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
AND FOR THE
SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

JAMES MILNE & SON,
GAS ENGINEERS,
Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
EDINBURGH, AND
2, KING EDWARD STREET,
NEWGATE STREET, LONDON.

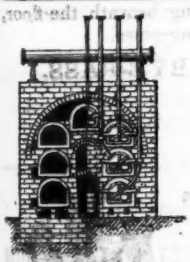
STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,
And every description of Gas-Fittings and Gas Apparatus.

ESTABLISHED 1844.

WHITLEY PARTNERS, LIMITED,
RAILWAY WORKS, LEEDS,
ENGINEERS, FOUNDERS, AND LICENSEES;
MANUFACTURERS OF IMPROVED STEAM-ENGINES, BOILERS, PUMPS, &c.;
MAKERS, BY SPECIAL MACHINERY, OF PATENTED MECHANICAL INVENTIONS,
Comprising numerous Labour-saving Appliances and Economizers of Fuel and Motive Power;
CONTRACTORS TO THE EUROPEAN & COLONIAL GOVERNMENTS & CORPORATIONS;
MERCHANTS AND SHIPPERS OF MACHINERY, METALS, AND HARDWARE;
AWARDED
THE FIRST PRIZE MEDAL AT THE EXPOSITION UNIVERSELLE, PARIS, 1867,
"For Improved Construction, Excellence of Material, and Superior Workmanship;"
TWO GRAND GOLD MEDALS AT THE MOSCOW INTERNATIONAL EXHIBITION, 1872;
ALSO THE FIRST PRIZE MEDALS AT LEEDS AND LYONS IN 1858, 1868, and 1872.
"REDUCTION IN PRICES OF PEET'S VALVES, consequent upon largely increased sales."

ILLUSTRATED CATALOGUES AND ESTIMATES ON APPLICATION.
Correspondence conducted in English, German, or French.

Samples of Specialties may be inspected at Stand No. 542, Group XIII., in the English Machinery Annexe of the Vienna Exhibition, 1873. For List of same see German Official and "British Section" Catalogues.



HENRY SKOINES,
PATENTEE
AND
CONTRACTING GAS ENGINEER,
FOR
SETTING RETORTS,
ERECTING AND REMODELLING GAS-WORKS
Of any extent, at Home or Abroad,
Address, 7, ARGYLE STREET, KING'S CROSS, LONDON, W.C.

THE PATENT
"UNIVERSAL" STEAM PUMP.
SOLE MAKERS,
HAYWARD, TYLER, & CO.,
84 & 85, UPPER WHITECROSS STREET, LONDON, E.C.

IN USE IN SOME OF
THE PRINCIPAL GAS-WORKS IN LONDON, SHEFFIELD, PENISTONE, &c.,
FOR
TAR AND AMMONIACAL LIQUORS.

Ardwick Bridge Chemical Works, Manchester, Oct. 28, 1872.

Sir,—The "Universal" Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily.—Yours truly,
(Signed) PETER HART, *Manager.*

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000.

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B Instruments, Bells, and Apparatus.
J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

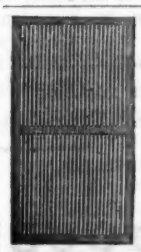
ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main-Pipes by an improved Patent, General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

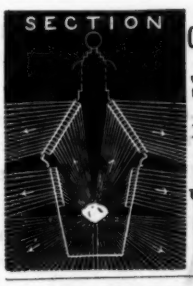
E. GODDARD,
GAS-WORKS, IPSWICH,
SOLE AGENT FOR
EDGE'S PATENT
FOR REMOVING THE
CARBONACEOUS INCRUSTATION FROM GAS-RETORTS.

INTERNATIONAL EXHIBITION, 1862.
CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and
"HONOURABLE MENTION" for
good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE.

TO GAS COMPANIES, ENGINEERS, &c.
WOOD SIEVES.—WOOD SIEVES.
Estimates given and Contracts taken by the Manufacturer
GEORGE MACKANESS,
36, EDWARD STREET, HAMPSTEAD ROAD,
LONDON, N.W.
These Sieves are made with parallel or bevel bar, and guaranteed to be well seasoned yellow deal, and not common spruce so generally used.
N.B.—Specimens sent free on application.



DEMPSTER'S
RENOWNED
WOOD SIEVES,
WITH TAPER BARS,
MADE BY MACHINERY
CAPABLE OF MAKING 10,000 FEET WEEKLY.
References to Hundreds of First-Class Engineers.
ROSE MOUNT IRON-WORKS,
ELLAND, NEAR HALIFAX.



THE PATENT
CATOPTRIC LAMP
for Streets and all Situations where the Light ascending above the level of the Lamp is wasted,
Is now in use in Moorgate St., London, and has been in successful operation upon Waterloo Bridge since Oct. 7, 1871.
T. A. SKELTON, 37, Essex St., Strand, LONDON,
INVENTOR AND PATENTEE.

GAS AND WATER PIPES.
WILLIAM MACLEOD & CO.,
METAL MERCHANTS AND CONTRACTORS,
18 & 20, ALSTON STREET, GLASGOW.
CAST-IRON GAS AND WATER PIPES AND FURNISHINGS.
MALLEABLE IRON TUBE FOR GAS, WATER, AND STEAM.
AGENTS FOR THOMAS GLOVER & CO.'S
PATENT DRY GAS-METERS.
DELIVERY F.O.B. ON CLYDE.
Lists on application.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.
For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.
For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CLAYTON'S PATENT SIX-WAY VALVE only requires one valve to work two purifiers; saves more than three-fourths of the connexion-pipes; requires neither tees, elbows, nor bends; no racks or springs to get out of order.
For particulars, apply to CLAYTON, SON, & Co., Engineers, Hunslet, LEEDS.

OXIDE OF IRON.—
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

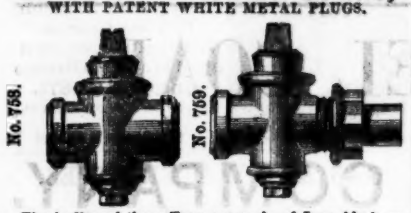
BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Agent in London, Mr. J. MANWARING, 101 Cannon Street E.C.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.
Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
Successors to
E. BAKER AND Co., LATE BRIERLEY HILL, STAFFORDSHIRE.

WALTER MABON & CO.,
Engineers,
ARDWICK IRON-WORKS,
FAIRFIELD STREET, MANCHESTER,
MANUFACTURERS OF
IRON TANKS, GASHOLDERS,
GAS APPARATUS,
PIPES, VALVES, IRON ROOFS,
WROUGHT AND CAST IRON GIRDERS.
DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

LAMBERT'S
CAST-IRON GAS-MAIN COCKS,
WITH PATENT WHITE METAL PLUGS.

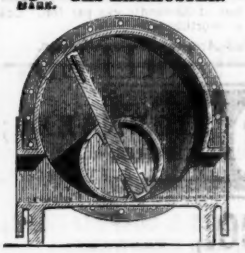


The bodies of these Taps are made of Iron, black or galvanized, and the Plugs of Patent Metal. They are warranted not to set fast or corrode as do iron or brass Cocks, will always work easily, are strong, well made, durable, of little or no intrinsic value, and, therefore, not likely to be stolen; and the PRICES are (especially upon the larger sizes) FULLY 50 PER CENT. LESS THAN BRASS COCKS.
GAS-JOINTS, CHANDELIERS, PENDANTS, BRACKETS, ETC.:
WROUGHT-IRON WELDED TUBE AND FITTINGS,
BRASS, COPPER, LEAD, TIN, AND COMPOSITION TUBING,
Stocks, Taps, and Dies, and Every Description of Gas-Fitters Tools; Gas Slide and Sluice Valves;
CARTER'S SAFETY GAS-VALVES;
GAS-STOVES, REGULATORS, BURNERS, &c.
Pattern-Book and Price List of Gas-Fittings, supplied on application.
THOS. LAMBERT & SONS, Lambeth, London, S.E.

F. & C. OSLER,
45, OXFORD STREET, LONDON, W.
MANUFACTORY AND SHOW-ROOMS:
BROAD STREET, BIRMINGHAM.
ESTABLISHED 1807.
MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,
WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.
TABLE GLASS OF ALL KINDS.
CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

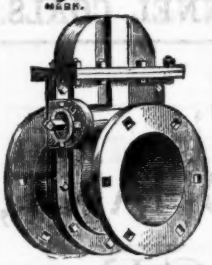
GEORGE ORME & CO.,
GAS-METER MANUFACTURERS, BRASSFOUNDERS & FINISHERS,
ATLAS METER-WORKS, OLDHAM.
CONSUMERS WET & DRY GAS-METERS ON THE MOST APPROVED PRINCIPLES.
STATION-METERS, GOVERNORS, PRESSURE-REGISTERS,
And every Description of Gas Apparatus.
GAS, STEAM, AND WATER FITTINGS.

TRADE J. BEALE'S PATENT GAS EXHAUSTER. MARK.



BEALE'S CONTINUOUSLY ACTING
GAS EXHAUSTERS
ARE NOW MANUFACTURED BY
B. DONKIN & CO.
MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.
B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise.
Estimates and Prices on application to
B. DONKIN & CO.,
ENGINEERS & IRONFOUNDERS,
BERMONDSEY, LONDON, S.E.

B. DONKIN & CO.'S
IMPROVED GAS-VALVES
TRADE MARK.



WITH WROUGHT-IRON PINIONS,
List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.
These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.
VALVES MADE WITH OUTSIDE RACKS TO ORDER.
ALSO,
SCREW WATER-VALVES WITH GUN-METAL FACES.
B. DONKIN & CO.,
GENERAL ENGINEERS AND IRONFOUNDERS,
MAKERS OF STEAM-ENGINES,
BLUE ANCHOR ROAD, BERMONDSEY,
LONDON, S.E.

TO GAS COMPANIES AND THE TRADE.
J. DEFRIES & SONS,
MANUFACTURERS OF
CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, VESTIBULE LAMPS, AND THE PATENT CRYSTAL ILLUMINATION.
A LARGE STOCK ALWAYS IN HAND OF
IRON, BRASS, COMPOSITE, AND LEAD TUBES, FOR GAS AND WATER,
AND EVERY DESCRIPTION OF
GAS AND WATER FITTINGS.
THE PATENT DRY AND WET METER, WITH THE LATEST IMPROVEMENTS.
STREET LAMPS AND COLUMNS IN GREAT VARIETY.
WORKS: LONDON AND BIRMINGHAM.

GAS MOONS,
Cut and Engraved, of the newest designs;
GAS REFLECTORS
In Silver and Glass;
GAS NIBS
AND
BURNERS
Of every description.
Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1874, are now complete.
City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.
ESTABLISHED 1830.

OLD WEMYSS CANNEL COAL.—Yield of gas per ton, 12,896 cubic feet; illuminating power, 31·75 standard candles. Port of shipment, Wemyss.

Analysis and price on application to Mr. Wm. Carey, Manager, Wemyss Colliery, Kirkcaldy, Fife.

THE
HUCKNALL COLLIERY COMPANY

Can offer a CANNEL COAL yielding a large quantity of Gas of superior quality.

Prices and information on application to the Hucknall Colliery Company, Hucknall Torkard Collieries, near Nottingham.

POPE & PEARSON'S GAS COAL.—We have now the authority of several of the most eminent Gas Engineers of London in stating that our Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to Pope and Pearson, West Riding and Silkstone Collieries, near Leeds.

CANNEL COAL.
COPPA COLLIERY, MOLD,

Beg leave to call the attention of Gas Companies to the superior quality of their

CANNEL FOR GAS-MAKING PURPOSES.

This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·5-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

Waggons supplied for delivery by railway to any part of England or Wales.

For particulars, prices, and rates of freight, apply to The Coppa Colliery, Mold, Flintshire.

THE MIDLAND COAL COMPANY

Are prepared to enter into CONTRACTS with

CORPORATIONS & GAS COMPANIES

FOR SUPPLIES OF

GAS COAL & CANNEL.

Prices, Analysis, and other information on application at the

MIDLAND COAL OFFICES,

118a, OXFORD STREET, MANCHESTER.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

173, ST. VINCENT STREET, GLASGOW.

RUSSEL'S BOGHEAD.

MUIRKIRK, No. 1, CANNEL

Yields 11,600 cubic feet of 34·3-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

MUIRKIRK, No. 2, CANNEL

Yields 10,700 cubic feet of 32·77-candle gas per ton, and 9½ cwts. of coke, containing only 11 per cent. of ash.

RIGSIDE CANNEL

Yields 11,900 cubic feet of 35-candle gas per ton. Coke worthless.

Prices and full Analyses on application.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal Scotch Cannel Coals. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,
CANNEL COAL MERCHANT,
HAYMARKET, EDINBURGH.
Established 1840.

LEE and JERDEIN,
COAL OWNERS & MERCHANTS.
Chief Office:
9, LANCASTER PLACE, STRAND, LONDON, W.C

SOLE VENDORS FOR
LONDON & THE SOUTHERN COUNTIES
OF
WIGAN COAL AND CANNEL,
From the Mines of the
INCE HALL COAL & CANNEL COMPANY, Limited,
AND
Messrs. W. H. BRANCKER & Co.

EVERY DESCRIPTION
OF
GAS COAL AND CANNEL
SUPPLIED BY
E. FOSTER & CO.,
COAL and CANNEL
MERCHANTS,
21, JOHN STREET, ADELPHI,
LONDON, W.C.

Prices Quoted on application.

CANNEL COAL.

ELLIS LEVER & CO.,

GAS COAL MERCHANTS,

107, PICCADILLY, MANCHESTER.

ALL CLASSES OF

ENGLISH, SCOTCH, & WELSH CANNEL COALS.

ALBERT GAS COAL.

THE DERBYSHIRE
SILKSTONE COAL COMPANY,
LIMITED,
CAN OFFER A
GAS COAL
Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average) 10·375
Weight of coke in lbs. per ton of coal 1462

Analysis and Prices on application to
MR. EDMUND TAYLOR,
SECRETARY,
ALBERT COLLIERY, NEWBOLD,
near CHESTERFIELD.

G. J. EVESON,

GAS COAL MERCHANT,

STOURBRIDGE.

Delivery per Rail to any Part.

PRICE'S PATENT COKE & COAL BARROW,

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. Price, Inventor and Patentee, Gas-Works, Hampton Wick, Middlesex.

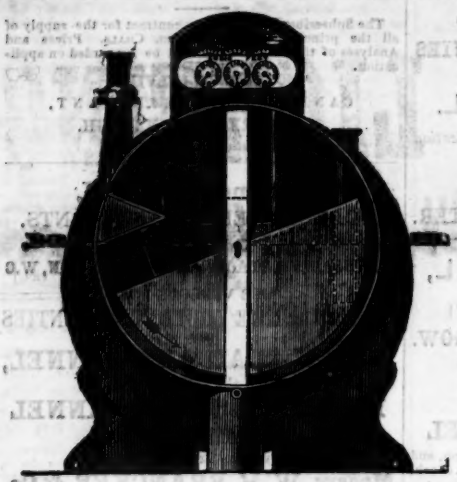
DUKINFIELD CANNEL COAL.

THE DUNKIRK COAL COMPANY.

OFFICES:

ASTLEY DEEP PIT, DUKINFIELD.

ANALYSIS, PRICES, AND OTHER INFORMATION, ON APPLICATION AT THE ABOVE OFFICES.



THE

UNVARYING WATER-LINE GAS-METER.

(SANDERS AND DONOVAN'S PATENT.)

"Unquestionably the best Water Gas-Meter now in use."—Thos. G. Barlow, C.E.

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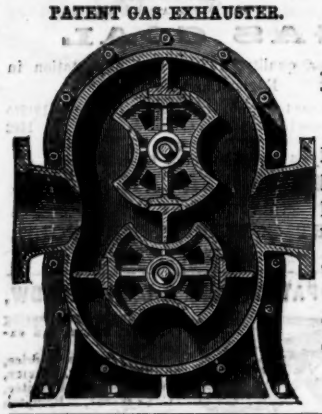

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